

PROCEEDINGS
OF THE
SCIENTIFIC MEETINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 10, 1867.

A. R. Wallace, Esq., F.Z.S., in the Chair.

Mr. P. L. Selater exhibited some specimens of birds from the recent collections of M. Adolphe Boucard, C.M.Z.S., in Southern Mexico*, and pointed out the characters of a new species of Finch, of which examples had been obtained by M. Boucard in the vicinity of La Puebla. This was proposed to be called

— ZONOTRICHIA BOUCARDI, sp. nov. (Plate I.)

Supra cinerea, plumis mediallyter brunneis cinereo late marginatis; pileo fere omnino rufo, cinereo paulum mixto; linea superciliari ante oculos et ciliis oculorum albis: genis et cervicis lateribus pure cinereis: remigibus et rectricibus intus nigricantibus, extus brunnescenti-cinereo marginatis, alarum secundariis colore magis brunnescente et latius marginatis; tectricibus extus dorso fere concoloribus: subtus albicanti-cinerea, gutture toto albo, striga utrinque nigra; ventre medio lactescenti-albo, utrinque cum crisso fulvescente tincto: rostro superiore nigro, inferiore

* See P. Z. S. 1865, p. 397.

una cum pedibus pallidis: long. tota 6·4 poll. Angl, alæ 2·7, caudæ rectr. med. 3, lat. 2·5, tarsi 0·8.

Hab. In Mexico meridionali, Orizaba (*Botteri*); La Puebla (*Boucard*).

“*Obs.* I have had three indifferent skins of this species (collected by M. Botteri near Orizaba) for several years without being able to identify it satisfactorily. M. Boucard’s recent collections having contained excellently prepared examples, I have been enabled to make a better examination of it, and to satisfy myself that it is, as far as I can tell, undescribed. It is a short-winged species, and may perhaps be placed in the genus *Peuceæa*; but for the present it is better to leave it with *Zonotrichia*. The fourth and fifth primaries are longest, but barely exceed the third and sixth. The first is rather shorter than the longest secondaries. The colours of the head and upper back much resemble those of *Peuceæa æstivalis*, but the red markings are rather brighter in tint in the present bird.”

The Secretary read the following extracts from letters received from Mr. Edward Bartlett, dated November 5th, 1866, Xeberos, Yurimaguas, Huallaga River, Peru:—

“I have made a four months’ expedition through the Missions of the High Amazons, and have been very successful in collecting Birds, Mammals, Fishes, Insects, and Shells; I have obtained some fine Humming-birds, and I hope some of them will be new.”

“I have also what I believe to be a new species of Spider Monkey, a tremendous beast when alive. It has a straight, erect, golden-yellow crest, a white stripe on each side of the face, belly and inside flanks brownish yellow, back black; I obtained it in the mountains. The Indians regarded it as a great prize. I crossed the mountains, taking with me three Indians, from Chyamatos to the Pampas on the other side; I went in search of the Cock-of-the-Rock (*Rupicola*), but was not very successful; I, however, obtained this rare Monkey; and afterwards I visited a small Indian town (three days’ journey from Chyamatos) in order to secure a young one of this species. The Indians had it alive, and prized it very much. I, however, succeeded in getting the ugly little beast, which is alive and well; it does not differ in marking from the adult, but is not so bright in colour. From here I intend to visit the mouth of the Huallaga, and pass up the Amazons to the First Falls and to the Indian towns on the upper river. This I shall do in a canoe, as I find this the best plan. Afterwards I return to Nauta and try for Porpoises and Manatees in and near the mouth of the Ucayali River, as this is the only chance I have of getting these animals.”

“I have had perfect health during the last five months: but food is frightfully dear—a small fowl 2s., a very little pig 20s.; and my appetite is alarming. I hope to send home the collections I have made in January next by the steamer.”

The following papers were read:—

1. Remarks on an Antelope from the White Nile, allied to or identical with the *Kobus sing-sing* of Gray. By JAMES MURIE, M.D., F.G.S., Prosector to the Society.

(Plate II.)

Before entering into the subject of the present paper, I feel it my duty to pay a slight tribute to the memory of a noble-minded and gallant, although little-known, White-Nile traveller, the Baron Wilhelm von Harnier, a native of Hesse Darmstadt.

Having planned a journey into Central Africa, for the double purpose of hunting and collecting objects of natural history, to enrich the Museum of the capital of his native Duchy, he proceeded, at his own expense, by way of Egypt and Nubia to Khartoum, where, after a brief sojourn, he embarked in a native boat with hunters and stores for land travel, and started on an expedition up the White Nile. Possessing great inherent talent as an artist, and a fair share of information as a naturalist, Baron Harnier sketched with truly scenic effect the inhabitants, country, and animals of the region which he was exploring. Unfortunately for the interests of zoology and geography, death snatched him off too early in his career; nevertheless he had already produced sufficient material in portfolios of drawings and notes to enable his brother (Baron von Harnier, of Ehzel, Hesse) to give to the world a posthumous volume, 'Reise am Oberen Nil,' 1865. This work, almost unknown in our country, forms (I can safely say from personal knowledge of that river) the most splendid volume of its kind, so far as truthful plates are concerned, delineating the peculiar scenery and savage tribes bordering the White Nile. Notwithstanding the successful journeys and works of our daring and enterprising fellow-countrymen Captains Speke and Grant, Sir Samuel Baker, and others, I have no hesitation in saying that Baron Harnier's posthumous volume will carry down to posterity a more vivid impression of the Nile valley and its inhabitants, just previously to the sweeping away of its savagery and the introduction of semicivilization through the hordes of Arab and Egyptian adventurers, than any book yet published on the subject.

As, however, I do not mean to give a memoir of his life, I shall further merely allude to the sad manner of his death, as evincing a degree of courage highly creditable to the German nation. He had spent but a few months in slowly ascending the stream, and reached the Kytch and Aliab country, between lat. 6° and 7° N., where he made a stay at the Catholic Mission Station, enjoying the hospitality of Herr Morlang, a native of the Tyrol. One morning he went off to shoot buffalos, when a wounded animal rushed at the hunters (as these creatures are often wont when badly hurt and unable to get away), singling out and attacking a poor Arab attendant, who ran imminent chance of a cruel death without any succour from his frightened fellow-servants. But the Baron, brave and generous to a fault, dashed with unloaded gun to his assist-

ance, and, while saving the life of his servant, perished himself in the attempt.

Among Harnier's collection of objects transmitted to Germany were two skins of a large Antelope. One of these has been mounted, and now forms an elegant specimen in the Ducal Museum of Darmstadt; and as this specimen possesses some interest from its probably representing or being closely allied to an animal shot by our lamented countryman the late Capt. Speke in Uganda* (the head and horns of which are deposited in the British Museum), I have ventured to bring the following notice of them before our Society.

I am indebted to Prof. Dr. Kaup for permission to examine the stuffed and dried skins; and the very accurate water-colour drawing which I here exhibit to the Meeting is due to the artistic efforts of his skilled assistant and conservator, F. Kerz of Darmstadt. The accompanying lithographic plate (Pl. II.) is a reduced copy of that drawing, and demonstrates more clearly than would a description the appearance of the animal.

It will be seen that in the general aspect of the form and coloration it approaches nearly to the Waterbuck (*Kobus ellipsiprymnus*); but it wants the whitish elliptical band over the croup and hips, so peculiar to that species; while this specimen has lightish-coloured rings above the hoofs, which is not the case in *K. ellipsiprymnus*. In other respects, as to horns and the umber-brown tint of the hair, the two bear a close resemblance.

Compared with Rüppell's description and figure † of *Antilope defassa* it agrees completely. But as Dr. Gray (P. Z. S. 1850, p. 131, and Knowsley Menagerie, 15) considers the *A. defassa* of Rüppell to be but a synonym of his *Kobus sing-sing*, Harnier's Antelope therefore would thus come under the latter appellation.

Moreover, from my own examination of a living *K. sing-sing* in the Antwerp Zoological Gardens (labelled *Antilope unctuosa*, Laur., a synonym), and two stuffed specimens in the British Museum, together with the head brought from Uganda by Capt. Speke identified with *K. sing-sing* by Dr. Sclater ‡, I confess, although at first having some misgivings as to the identity of the two White-Nile specimens in Darmstadt with the Sing-Sing of West Africa, that I cannot adduce proof of their separateness, but rather evidence of their specific affinity.

The peculiar greasy-like cuticular transpiration in the living Sing-sing, well named *A. unctuosa* by Laurillard, was a point which at first particularly struck me; for in both skins in the Darmstadt Museum, there is neither to the touch nor look any appearance or remnant of such a secretion, whereas in the mounted specimens in the British Museum, and even in the head from Uganda, this character is to a certain extent notable. The cause of this secretion may be worthy of investigation; it is so copious in the live animal that the

* Journal of the Discovery of the Source of the Nile, 1863, p. 471.

† 'Neue Wirbelthiere zu der Fauna von Abyssinien gehörig' (1835-40), Säugethiere, vol. i. p. 9, pl. 3.

‡ Figured in 'Proc. Zool. Soc.' 1864, p. 102.

skin appears as if drenched with water, or, rather, burnished with oil.

Its being wanting in the skins from the Nile, if it did originally exist, might be accounted for by the manner of their preparation (namely, partial drying in the scorching sun), or by the intermixture of sandy particles among the hairs.

Again, in regard to colour, the West-African specimens (horned male and hornless female) in the British Museum, the head from Uganda, and the animal alive in Antwerp all have more or less of a *yellowish* brown or russet tinge, considerably lighter in shade than either of the two skins which Dr. Kaup has provisionally named *Antilope harnieri*, and which exhibit a kind of dark umber tint.

The short hair of the skin of these Nilotic animals, also, shows a contrast with the comparatively shaggy coat of the Senegal specimens. But this variety in colour and length of hair only bears out what Dr. Gray has remarked upon this point, in his description of the species (P. Z. S. 1850, p. 131). The mounted specimen in Darmstadt (that here figured) is said to be in the dress of the rainy season; the other dried skin, with even still shorter hairs, is considered to bear the coat of the dry season; but neither have the abundance or length of hair of the Senegal specimens of the Sing-sing.

Notwithstanding the differences mentioned above, which may either be attributed to variety, season, or geographical distribution, the proportions of body, head, and horns are such that no distinct line of demarcation can be drawn between the Antelopes obtained from the White Nile by Baron Harnier and the Sing-Sing inhabiting the more westerly part of the same continent.

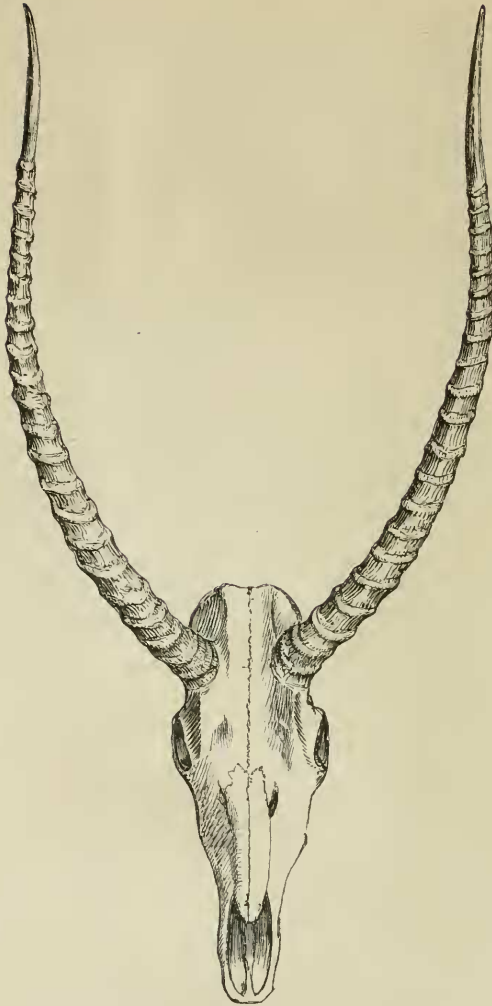
The following table illustrates in inches some of the approximate measurements of the stuffed animals:—

	Darmstadt specimen.	Brit. Mus. specimen.	Speke's spec.
Height at the shoulder	45 $\frac{3}{4}$	45 $\frac{1}{2}$..
Length of body, rump to front of shoulder. . .	52
— of head, from between the horns to tip of muzzle	13 $\frac{1}{2}$	13	..
— of tail	16	11	..
Horns, in length	23 $\frac{1}{2}$	22	24
—, girth at their roots	7 $\frac{1}{2}$	8	7 $\frac{3}{4}$
—, number of rings on each.	8		
Length of ears	20	24

The figures of the horns and skull of Baron Harnier's specimen now exhibited (see figs. 1 & 2, pp. 6 & 7) are also copied from the pencil drawings of Herr Kerz, and are reduced to about a seventh of their natural size.

In the manner in which the horns branch outwards and backwards, and with only a slight tendency to return forwards at the tips, they agree with Capt. Speke's animal. They at the same time have a nearer resemblance to those of A. Smith's typical South-African specimen of *Kobus ellipsiprymnus*, now in the British Museum, than to the *Kobus sing-sing* in the same collection. The latter male animal,

Fig. 1.



Front view, skull and horns of Harrier's Sing-sing.

I learn from Mr. Gerrard, was originally in the Earl of Derby's menagerie at Knowsley, and afterwards for some years in the Society's Gardens in the Regent's Park. In this stuffed specimen the left horn is injured at the tip, and both horns have a more flattened or horizontal backward direction and almost no forward recurve at the tip, as in the head from Uganda, or even in the allied species *K. elliptiprymnus* in the same series.

It may be mentioned that Capt. Speke gives an illustration (*op. cit.*) of the N'samma Antelope, which appears to be the native name in Uganda for the *Kobus sing-sing*.

Sir Samuel Baker, in his interesting 'Albert Nyanza, Great Basin of the Nile' (1866, vol. ii. pp. 15, 16), tells of an Antelope shot by him near the Asua River, 3° 12' W., which he calls the Mehedehet Antelope. He says the Mehedehet weighs about 500 lb., stands 13 hands high, and has rough brown hair like the Sambur Deer of India. This description in some respects agrees with the Sing-sing, although the woodcut of the head given is not in perfect correspondence with Speke's or the present figures.

Fig. 2.



Skull and horn of Harnier's Sing-sing, in profile.

In conclusion, the foregoing remarks may be said to lead to the inference that the Antelope to which the name of *Kobus sing-sing* has been assigned appears to range in Africa from Senegambia on the west to Abyssinia on the east, and to be found, with slightly varying characters, as far south as Uganda, close upon the equator.

In some senses the Waterbuck (*Kobus ellipsiprymnus*) would seem to be its representative in South Africa, and the Nile specimens or variety of Sing-sing-be a kind of intermediate link between its North-west-African congeners and this allied species of the southernmost end of the continent.

On the other hand, further tracing analogies, the Lechè (*Adenota*

lechè) might be said to be the South-African prototype of the West-African *Æquitoon* (*Adenota kob*), notwithstanding that these forms are found within a short distance of a parallel northern latitude. In the one case the animals inhabiting the southern equinox are darker and larger than those of the northern equinox. Examples might be given of other animals presenting analogous shades of difference: for instance, the Giraffes found north and south of the equatorial line have by some naturalists even been considered specifically distinct; and other authors point out like shades of difference in the Elephant &c.

How far such suggestions are surmise, and how much based on wider generalizations, more extended facts would better determine; but such thoughts do arise on considering what has been shown to occur in the fauna of other extensive continents, *e. g.* in the insects and birds of South America.

2. On *Cygnus buccinator*, Richardson, and *Cygnus passmori*, Hincks. By JAMES MURIE, M.D., F.G.S., Prosector to the Society.

The Rev. W. Hincks, F.L.S., Professor of Natural History in the University of Toronto, Canada, communicated to the Linnean Society, on the 21st January 1864*, a short but suggestive paper, wherein he gave to a specimen of Trumpeter Swan the name of *Cygnus passmori*. In a letter dated 10th of April, and subsequently read on the 5th of May of the same year, he, however, threw out hints of the possibility of an error of judgment on his part, as further investigation led him to believe that the difference in individual specimens which he at first was inclined to regard as specific might really not be such, but rather be attributable to gradation of form connected with age.

The facts brought forward by that gentleman, so far as I know, have thus been left in uncertainty; and hence arises the interrogation, Are there characters sufficiently distinct and constant to warrant a separation of the Trumpeter Swan into two species? or is the variation in individual form merely a modification or progression of growth as suggested by Prof. Hincks?

I will in the present paper endeavour to answer these questions, at least as far as the evidence goes which the examination of three specimens affords.

These were added to the Zoological Society's Collection in the Regent's Park on the 10th of May 1866, and assumed to be the true Trumpeter Swan (*Cygnus buccinator* of Richardson). Two of the birds died a short time after their arrival, and afforded me an opportunity of examining that part of the skeleton in which the chief grounds of specific separation are found, *viz.* the sternum, which in

* Published in the 'Journal of the Proceedings of the Linnean Society,' vol. viii. (1865), pp. 1-7.

each case was carefully compared with Yarrell's* and Hincks's figures of *C. buccinator* and *C. passmori* respectively.

First.—In connexion with external characters, I shall give a comparison of the specimen still alive in the Gardens with Hincks's and Yarrell's descriptions, premising that the two birds which died presented characters perfectly identical with their companion, excepting it may be in their dimensions, which were not taken.

The specimen under consideration, as a whole, seems to combine some of those characters attributed to *C. buccinator*, and others more distinctly connecting it with *C. passmori*. The entire body, including wing-feathers, upper part of head, and neck are pure white, and without any admixture of the ferruginous tint on the head and neck said to be constant and characteristic of *C. buccinator*, while it is also wanting in the pale grey of the same parts and fawn-coloured wing-tips of *C. passmori*. The legs and feet are black, but between the webs of the latter there is a somewhat lighter tinge of the dark hue. The beak is jet-black, as well as the naked skin posterior to it. This black skin only reaches the eye, as shown in the figure taken from the photograph of *C. passmori* given by Hincks, and not surrounding it, as that author says it does in what he considers the true *C. buccinator*.

The contour of the upper mandible, compared with the outline woodcuts in the same paper (*l. c.* figs. 1 & 2, page 6), appears intermediate between the concavity of *C. passmori* and the convexity of his *C. buccinator*, being rather a straight line than otherwise.

The weight of the live bird is 20 lb.; but it must be taken into account that it is in very poor condition, and only recovering from the effects of transport; nevertheless it is 2 lb. heavier than the specimen of *C. passmori*, although 10 lb. less than what Hincks gives of *C. buccinator*; so that, if in fair condition, it may be assumed that it would attain a medium weight between these two.

The measurements of the several parts of the body, again, are intermediate between the species, or at least greater than in *C. passmori*,—which the subjoined table illustrates in inches. The first and last columns represent Prof. Hincks's data; the middle one the specimen which has come under my observation.

	<i>C. passmori.</i>	Zool. Soc. sp.	<i>C. buccinator.</i>
Length from tip of beak to end of tail	51	52	60
— of head in line of the meeting			
of mandibles	7 $\frac{1}{4}$	7 $\frac{1}{2}$	9 $\frac{1}{2}$
Distance from the back of the eye to			
tip of beak	5	5 $\frac{1}{4}$	5 $\frac{3}{4}$
— between hind point of nostril			
and tip of beak	2	2 $\frac{1}{2}$	3

It is true that Yarrell, in his paper already quoted, gives the dimensions of *C. buccinator* as somewhat greater than the above; but his measurements were taken from a stuffed specimen, while he adds

* Transactions of the Linnean Society, vol. xvii. pp. 1-4, tab. 1.

that two other skins of the same species examined by him afforded smaller dimensions.

Secondly.—Respecting the osteological evidence afforded by the sternum, it may be stated that both the dead birds exhibit a difference in the shape and relative height of the elevated bony lamella enclosing the convolution of the trachea, likewise in the general dimensions of the entire sternum, as also in its outline figure when viewed from the inside including the posterior sinuses; moreover the osseous rings of the trachea, previous to entering the carina, are not the same in each specimen. These marks of variation, whatever their value, may require a separate description. I shall first mention, for the benefit of other inquirers, that the entire skeleton of the one bird is now deposited in the British Museum, at present beside the stuffed specimens of the genus *Cygnus*; the sternum of the other forms part of the osteological series in the Museum of the Royal College of Surgeons.

The accompanying figures represent these two sterna seen from

Fig. 1.

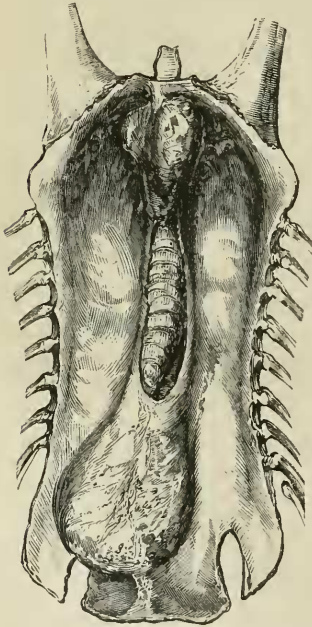
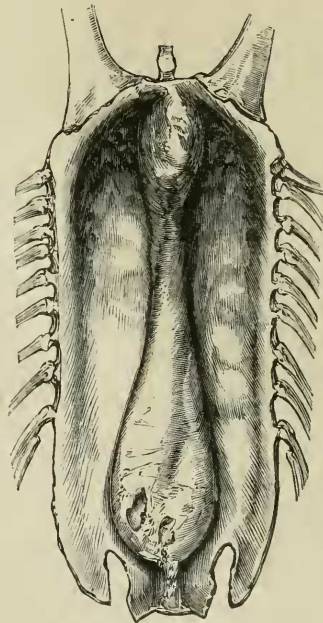


Fig. 2.



Sterna of Trumpeter Swans.

above (or inside), but without the trachea and distended bronchiæ, which are preserved intact in both the original specimens.

The specimen represented in fig. 1 is the sternum of the male bird

now in the College. The trachea in it, as Yarrell (*loc. cit.*) has described and most beautifully figured in a profile section of *C. buccinator*, comes down the neck, enters the keel, runs backwards to near the posterior end of the sternum, loops round and returns, entering the second highly raised hollow protuberance on the dorsum, again dipping ere it makes its exit under the furcula.

So far this all agrees with what Prof. Hincks says of *C. passmori*; but this author lays stress on the shape and size of the bony expansions lodging the bent trachea, and describes afresh the structure in what he believes to be the true *C. buccinator*.

The College specimen has the posterior osseous expansion 3·1 inches long, and 1·2 broad at its greatest diameter. This expansion is of an oval shape, rather truncated behind, and placed very much to the left side of the median line, excentric in this particular. Its right side is lowest; at ·6 inch from that edge, and almost at what corresponds to the middle of this part of the sternum, is a slightly depressed longitudinal furrow; from this to the left margin the bony expansion rises more quickly, until attaining a maximum height of $\frac{6}{10}$ of an inch above the horizontal sternal plate; the left edge is nearly perpendicular.

Between the anterior end of the posterior and the posterior end of the anterior osseous protuberance, the superficial protecting lamina of bone is wanting, here exposing the trachea.

The anterior, smaller but much more elevated hollow is somewhat heart-shaped, the indented broader end forwards; but here a narrow isthmus of bone joins it to the anterior sternal arch. On its left superficies it is somewhat low and flattened, where rests the laterally compressed termination of the trachea, before giving off the enlarged globiform bronchiæ.

On the right moiety the bone rises $\frac{3}{4}$ of an inch higher, and is as it were compressed on either side, but has a high arched form when viewed in profile. The dimensions of this bony protuberance are 1·5 inch from before backwards, and fully 1 inch in its greatest transverse diameter. It is raised a little more than an inch above the highest level of the outer sternal plate of bone, to which the foremost ribs are attached.

The two posterior sternal emarginations are finger-shaped, and above an inch deep. The left one is overlapped and partially hidden by the after tracheal protuberance (see fig. 1). The greatest length of the entire sternum is $8\frac{1}{2}$ inches; the extreme breadth, viz. posteriorly, equal to 4 inches.

The side view agrees in the main with Yarrell's figure; Hincks's does not display the details of structure so accurately.

Looked on from above or inside, as in the figure (fig. 1), the two costal edges have a long but shallow concave outline, so as to produce a tendency to a sand-glass form.

In the total length of the sternum and in the height and inclination to the right of the anterior protuberance it thus corresponds to Hincks's description of his *C. buccinator*; but the breadth agrees with *C. passmori* and with Yarrell's *C. buccinator*. The tracheal

rings I shall mention hereafter, but here only point out they are like Yarrell's plate, and not Hincks's figure of them in his *C. buccinator*.

The second figure (fig. 2) represents the sternum of the skeleton in the British Museum, contrasted with that of its companion bird (fig. 1). The disposition and inflexions of the trachea correspond to the one first described, and with it confirm the accuracy of Yarrell's distinctions between the Hooper, with one vertical sterno-tracheal convolution, Bewick's Swan, with a single horizontal one, and the Trumpeter with two, one in each of these directions.

In the specimen in question (fig. 2) the posterior tracheal osseous eminence is situated nearly equidistant between the right and left sides. Its length is not so sharply defined as in the other; but its measurements correspond to about 3 inches long and $1\frac{1}{2}$ broad. Neither is it so lop-sided in form, and it wants the posterior truncation present in its fellow bird, while its surface rises from each margin equally, until attaining in the middle a height of $\frac{1}{2}$ an inch above the level of the horizontal sternal plate. There is a very slight foramen or deficiency of bone towards the left side.

The anterior tracheal bony prominence is ovoid, and not heart-shaped as in the College specimen. The depression or shelf upon which the end of the trachea and bronchiæ rest is not so broad nor by any means so scooped out as in the other. The greatest height which the bone reaches in this cavity is but $1\frac{1}{2}$ inch, and the sides are less perpendicular.

The sterno-tracheal elevations in the points mentioned above, particularly the height of the anterior and less magnitude of the posterior, agree closely with those of *C. passmori*.

The posterior sternal emarginations in the British Museum specimen are both uncovered, and neither of them is so deep or smooth-edged as in the companion bird. The greatest length of the sternum is $8\frac{1}{4}$, and its breadth behind $3\frac{1}{4}$ inches.

The costal edges run almost parallel; the terminal manubrial and ensiform plates are comparatively the narrowest; and the sternum altogether is shallower inside, or at least shelves more gradually towards the middle.

Over and above these strictly sternal differences, the rings of the trachea in the two birds present variation. In the British Museum specimen the bony rings, from the bend of the neck to where the trachea enters the keel, are intermittingly broad and narrowed or wedge-shaped on the upper and lower halves; in other words, each half of the ring is unequal in breadth and dovetailed to those on either side of it, just as Hincks has depicted (*loc. cit.* p. 6. f. 8) in the trachea of his *C. buccinator*, where it divaricates at the bronchiæ. In the College specimen the rings are nearly uniform in breadth, or very sparingly show this peculiar kind of wedge-shape. In both specimens the trachea, after its emergence from the sternum, has wider, regular rings, such as Yarrell's sectional view illustrates; but the College specimen has here and there a tendency to revert to the unequal form.

This tracheal character reverses the similitude exhibited by the two sterna to *Cygnus passmori* and *C. buccinator* respectively. Moreover it would seem that no two sterna of all mentioned are identical in every point.

Finally.—The foregoing details regarding external and internal points of variation, if taken together and placed in juxtaposition with those of the authors mentioned, lead partly to the decision thrown out by Prof. Hincks himself, that there is a variability “or succession of degrees of development according to age;” in the Trumpeter Swan (*Cygnus buccinator*) it may be also in sex, although I am rather of opinion that it is an individual difference not always dependent on age or sex. Whichever of these may have most weight, the distinctions which he at first attributed as specific appear in reality not to be valid.

In favour of this view, we have three specimens all agreeing in common, and yet differing slightly from his and Yarrell’s accounts of the colouring. For the rufous coloration does not necessarily imply specific value, as it is well known to ornithologists in general that many of the *Anatidae* are more or less subject to an occasional rufous tinge, the reason of which is not satisfactorily ascertained. The Teal and Pintail are often conspicuous in this respect, and the head is generally so affected.

Much dependence cannot be placed on the weight or even on the measurements of the body, as age and condition seriously affect them.

In birds the sternum is the bone in which most dependence can be placed as indicating affinities, or even specific difference*; and this, along with the disposition of the trachea, is markedly so in the genus *Cygnus*, as Yarrell has well demonstrated. But here in *C. buccinator* we have in the variation no essential typical alteration, but simply a gradual growth and change in size of the parts, together with a certain amount of individual and developmental difference.

When it has been shown that in another species of *Cygnus* (*C. bewickii*) the osseous expansion destined to protect the enclosed loop of the trachea alters considerably, but within certain limits, from the young to the adult stage†, and that this alteration in size and relative position in the specimens of *C. buccinator* and in the so-named *C. passmori*, referred to or described in this paper, only exhibits the counterpart of such a change, it prepares us to believe, on the evidence adduced in our data, that Yarrell’s and Hincks’s bird are one and the same, and that *Cygnus buccinator* is alone the proper specific name to be retained by naturalists.

* Prof. Owen truly says the sternum is “the main characteristic of the bird” (On the Anatomy of the *Apteryx*, Trans. Zool. Soc. vol. ii. p. 290).

† See Trans. Linn. Soc. vol. xvi. (1833) p. 447, tab. 25, where Yarrell figures three differently aged birds, manifesting a gradual increase of the tracheo-sternal protuberance.

3. On the Fishes of Cachar.

By Lieut.-Colonel R. L. PLAYFAIR, F.Z.S.

(Plate III.)

I have received from Major Stewart, Superintendent of Cachar, a small but interesting collection of the Fishes of that region. He informs me that "they are from rivers, lakes, and ponds;" but he does not specify the particular specimens from each of these sources.

Cachar is one of the most eastern provinces of British India, and lies within the watershed of the Burhampooter; as might be expected, therefore, its fish-fauna is very similar to that of Assam. The collection contains about thirty species, twenty-six of which I have determined; the remainder are *Cyprinidæ*, either too small for correct identification or apparently new; these I have made over to Dr. Günther, who is at present engaged on that family, which will form part of the seventh volume of his 'Catalogue of Fishes.'

1. AMBASSIS RANGA.

Chanda ranga, Buch. Ham. p. 113, pl. 16. f. 38.

Ambassis ranga, Cuv. & Val. ii. p. 183; Günth. Fish. i. p. 228.

2. GOBIUS GIURIS.

Russell, pls. 50, 51, 53.

Gobius giuris, Buch. Ham. p. 51, pl. 33. f. 15; Günth. Fish. iii. p. 21.

3. NANDUS MARMORATUS.

Coius nandus, Buch. Ham. p. 96, pl. 30. f. 32.

Nandus marmoratus, Günth. Fish. iii. p. 367.

4. OPHIOCEPHALUS PUNCTATUS.

Ophiocephalus punctatus, Bl. Schn. p. 237; Cuv. & Val. vii. p. 404; Günth. Fish. iii. p. 469.

O. lata, Buch. Ham. pp. 63, 367, t. 34. f. 18.

O. indicus, McClell. Calc. Journ. Nat. Hist. ii. p. 583.

5. OPHIOCEPHALUS STEWARTII, sp. n. (Pl. III.)

D. 39-40. A. 27. L. lat. 50. L. transv. 5/9.

Shields on the upper surface of the head large. Some larger teeth in the lower jaw, and on the vomer and palatine bones. The height of the body is contained six times and two-thirds, and the length of the head four times in the total length. Scales on the cheeks very large, there being only seven in a longitudinal series between the eye and the gill-opening. The maxillary reaches beyond the vertical from the posterior margin of the orbit. The length of the snout is one-fifth, the width of the interorbital space is one-third, and the breadth of the head is three-fifths of the length of the head. The pectoral does not reach the anal, and is somewhat more than half

the length of the head. The length of the ventrals is less than half that of the pectorals.

Colour brownish black above, lighter below; most of the scales behind the roots of the pectorals have a round black spot in the centre. In immature specimens, 5 inches long, these spots are not perceptible. Fins dark, immaculate. In young examples the pectorals have transverse darker cross bands. Length $9\frac{3}{4}$ inches.

6. ANABAS SCANDENS.

Perca scandens, Daldorff, Trans. Linn. Soc. iii. p. 62.

Cojus cojojius, Buch. Ham. pp. 98, 370, pl. 13. f. 33.

Anabas scandens, Günth. Fish. iii. p. 375.

7. TRICHOGASTER FASCIATUS.

Trichogaster fasciatus, Bl. Schu. p. 164, t. 36; Günth. Fish. iii. p. 387.

Trichopodus colisa, Buch. Ham. pp. 117, 372, pl. 15. f. 40.

? *T. bejeus*, Buch. Ham. pp. 118, 372.

? *T. cotra*, Buch. Ham. pp. 119, 372.

? *T. lalius*, Buch. Ham. pp. 120, 372.

Of the four specimens of *Trichogaster* received from Cachar, two correspond to the commonest Indian form, *S. fasciatus*, while two others differ considerably from it both in form and coloration. As, however, this fish is very widely spread over India, and is subject to considerable variations, I hesitate to describe the latter as a new species.

TRICHOGASTER FASCIATUS, var.

D. $\frac{16}{8-9}$. A. $\frac{14-18}{14-16}$.

Body much more elevated than in the previous variety; its height is contained once and four-fifths in the total length without caudal; the length of the head is two-fifths of the same. Præorbital serrated. Caudal subtruncated. The dorsal and anal fins much more elevated than in any previously described variety; the fourth spine of the anal is the longest, the others decrease in length posteriorly; the longest spine of the dorsal (the last) is two-fifths, and the longest of the anal (the fourth) is one-third of the height of the body. The ventral filament reaches as far as the termination of the anal.

Colour of the body uniform silvery; the posterior parts of the vertical fins marked with blackish. Length 2 inches.

I have carefully examined the original drawings of Buchanan Hamilton's species in the British Museum; but this cannot be referred to any of them.

8. CLARIAS MAGUR.

Macropteronotus magur, Buch. Ham. pp. 146, 374, pl. 26. f. 45.

Clarias batrachus, Bleek. Atl. Ichth. Silur. p. 103, t. 98. f. 2.

C. magur, Günth. Fish. v. p. 17.

9. SACCOBRANCHUS SINGIO.

Silurus singio, Buch. Ham. pp. 147, 374, pl. 37. f. 46.

Saccobranchus singio, Cuv. & Val. xv. p. 400, pl. 445; Günth. Fish. v. p. 30.

10. EUTROPIICHTHYS VACHA.

Pimelodus vacha, Buch. Ham. pp. 196, 378, pl. 19. f. 64.

Bagrus vacha, Cuv. & Val. xiv. p. 392.

Eutropiichthys vacha, Günth. Fish. v. p. 38.

11. SCHILBICHTHYS GARUA.

Silurus garua, Buch. Ham. pp. 156, 375, pl. 21. f. 50.

Schilbe garua, Cuv. & Val. xiv. p. 379, pl. 413 (not good).

Schilbichthys garua, Günth. Fish. v. p. 57.

12. CRYPTOPTERUS LATOVITTATUS, sp. n.

Br. 12. D. 4. A. 56-58. P. $\frac{1}{11}$. V. 7.

The height of the body is about equal to the length of the head, or one-fifth of the total length (without caudal). Nape of neck convex. The dorsal is situated behind the vertical from the base of the ventral, and before that from the origin of the anal. Eye situated near the lower profile of the head. Cleft of mouth nearly twice as broad as long; lower jaw strongly prominent; vomerine teeth in a short narrow band. The maxillary barbels extend as far as the extremity of the pectoral. Mandibular barbels absent. Pectoral much shorter than the head; its spine is strongly denticulated on its inner side, and is little more than half as long as the head. Ventrals about once and a half as long as the eye. Caudal forked to about half its length; it is longer than the pectoral spine.

Colour silvery; an irregular oblong blackish patch along the commencement of the lateral line. Length $4\frac{1}{2}$ inches.

13. MACRONES CAVASIUS.

Pimelodus cavasius, Buch. Ham. pp. 203, 379, pl. 11. f. 67.

P. seengtee, Sykes, Trans. Zool. Soc. ii. p. 374, pl. 66. f. 2.

Macrones cavasius, Günth. Fish. v. p. 76.

14. BARBUS SOPHORE.

Cyprinus sophore, Buch. Ham. pp. 310, 389, pl. 19. f. 86; Cuv. & Val. xvi. p. 388.

15. LABEO PANGUSIA.

Cyprinus pangusia, Buch. Ham. pp. 285, 386; Cuv. & Val. xvi. p. 429.

Gobio pangusia, McClell. Ind. Cyprin. p. 279, 362, pl. 24. f. 1.

16. CIRRHINA DYOCHEILUS.

Labeo dyocheilus, McClell. Ind. Cyprin. pp. 268, 330, pl. 37. f. 1; Cuv. & Val. xvi. p. 461.

17. CROSSOCHILUS REBA.

Cyprinus reba, Buch. Ham. pp. 280, 386.

Cirrhinus dussumieri, Cuv. & Val. xvi. p. 291, pl. 480.

C. reba, Cuv. & Val. xvi. p. 292.

18. CROSSOCHILUS LATIUS.

Cyprinus latius, Buch. Ham. pp. 345, 393.

Gonorhynchus macrosomus, McClell. Ind. Cyprin. p. 372, pl. 43.
f. 7; Cuv. & Val. xvi. p. 411.

19. CYPRINUS RASBORA.

Cyprinus rasbora, Buch. Ham. pp. 329, 391, pl. 2. f. 90.

20. CYPRINUS MOLA.

Cyprinus mola, Buch. Ham. pp. 334, 392, pl. 38. f. 92; McClell. Ind. Cyprin. pp. 293, 407; Cuv. & Val. xvi. p. 440.

21. CYPRINUS BACAÏLA.

Cyprinus bacaila, Buch. Ham. pp. 265, 384, pl. 8. f. 76; Cuv. & Val. xvi. p. 460.

Osparius bacaila, McClell. Ind. Cyprin. pp. 295, 414.

22. CYPRINUS COTIO.

Cyprinus cotio, Buch. Ham. pp. 339, 393, pl. 39. f. 93; Cuv. & Val. xvii. p. 76.

Abramis cotio, McClell. Ind. Cyprin. pp. 288, 388.

23. COBITIS DARIO.

Cobitis dario, Buch. Ham. pp. 354, 394, pl. 29. f. 95; Cuv. & Val. xviii. p. 85.

Schistura dario, McClell. Ind. Cyprin. pp. 306, 444.

24. NOTOPTERUS KAPIRAT.

Gymnotus notopterus, Pallas, Spic. Zool. vii. p. 40, t. 6. f. 2.

G. kaporat, Bonnat. Encycl. Méth. p. 37, pl. 24. f. 83.

Notopterus kaporat, Lacép. ii. p. 190; Val. in Bélanger, Zool. Voy. Ind. p. 391, pl. 5. f. 1.

Mystus kaporat, Buch. Ham. pp. 235, 382; Gray, Ill. Ind. Zool.

Notopterus pallasii, Cuv. & Val. xxi. p. 130.

25. ENGRAULIS TELARA.

Clupea telara, Buch. Ham. pp. 241, 382, t. 2. f. 72.

Engraulis telara, Cuv. & Val. xxi. p. 56, pl. 608.

26. ALOSA MICROLEPIS.

Clupea indica, Gray, Ill. Ind. Zool.

Alausa microlepis, Cuv. & Val. xx. p. 439.

4. On *Hyalonema mirabile*.

By J. S. BOWERBANK, LL.D., F.R.S., &c.

(Plates IV. & V.)

Hyalonema was named and described by Dr. J. E. Gray in the Society's 'Proceedings' for 1835, p. 63, from a specimen sent from China to the India House in London, under the name of the Glass Plant, and subsequently in a paper published in the Society's 'Proceedings' for 1857, p. 279, entitled "Synopsis of the Families and Genera of Axiferous Zoophytes or Barked Corals." The author designates it as a Coral, and describes it as follows:—

"Family 1. HYALONEMADEE.

"Coral subcylindrical, rather attenuated, and immersed in a fixed sponge. Axis in the form of numerous elongated, slender, filiform, siliceous fibres, extending from end to end of the Coral, and slightly twisted together like a rope. Bark fleshy, granular, strengthened with short cylindrical spicula; polypiferous cells scattered, rather produced, wart-like, with a flat radiated tip.

"1. HYALONEMA, Gray.

"The character of the family.

"1. HYALONEMA MIRABILIS.

B.M.

"*Hyalonema mirabilis*, Gray, Syn. B. M. 1830, 118."*Hyalonema sieboldii*, Gray, Proc. Zool. Soc. 1835, 63; Dana, Expedition, 642."Japan (*Sir Hans Sloane; Siebold*).

"The Coral, as it is usually seen, consists of three distinct portions of very different texture and appearance—the axis, bark, and the sponge."

The author then proceeds to describe each of these parts in detail, and in page 282 he writes, "The sponge to which it is attached has no real connexion with the Coral, except as affording it the means of support, and is of the common structure." And subsequently he states it as his opinion that "There can be no doubt, after the examination of the two specimens in the British Museum, one in my own collection, one in Paris, and several in the Leyden Museum, that the bark evidently belongs to the axis, and that this Coral is a true Zoophyte, and not a sponge covered with a parasitic Zoophyte, as it is regarded by M. Valenciennes (see Milne-Edwards, British Corals, 81)." In the first sentence quoted the author asserts that the sponge is a part of the Coral; in the commencement of the following paragraphs he decidedly denies the connexion existing between them; but I presume that the latter is the real opinion of the author. In the 'Annals and Magazine' for October, 1866, Dr Gray corrects

his former opinion that *Hyalonema* belonged to the "Barked *Aleyonaria*," and announces his belief that it should be arranged with the *Zoanthidae*.

In the Society's 'Proceedings' for 1864, p. 265, M. Barboza du Bocage, Director of the Museum of Natural History at Lisbon, has described a specimen of *Hyalonema*, which was found off the coast of Portugal, near the mouth of the River Sado. This specimen does not appear to have had any portion of a basal sponge appended to it. The author designates the protuberant organs on the coriaceous coat of the spiral column as polypes; and describes what he conceives to be a row of twenty tentacles around the central orifice, and a second circle within the first one of conical elevations which appear to him to be rudimentary tentacles, which he describes thus:—"Les tentacules sont de forme triangulaire, comprimés des deux côtés, à bords parfaitement lisses, et à pointe mousse et arrondie. Ceux du premier rang sont plus larges à la base; et leur bord antérieur est plus convexe, et en forme de bourrelet arrondi."

The author subsequently obtained two other specimens of the same species, and described them in the same work for November 1865: in p. 663 he writes:—"Quoique l'hypothèse du parasitisme des polypes soit aujourd'hui en faveur, soutenue qu'elle est par de grandes autorités scientifiques, les résultats de mes observations sur les spécimens du Portugal me semblent plus favorables à l'hypothèse contraire." The author then proceeds to give the reasons for this conclusion under five separate heads.

The observations of M. Barboza du Bocage do not throw much light on the subject of the disputed nature of *Hyalonema*; and the proofs he offers under five separate heads go rather to prove the spongy nature of *Hyalonema* than its polypiferous nature. In no. 1 he merely states that no spongy base has been found on the Portuguese specimens; but this may also be stated of the greater number of specimens from Japan. He also states, in no. 2, that the corium polypigerum in one specimen from Portugal envelopes the whole of the axis entirely, from the smallest extremity, for two- or three-fifths of its length. And this is just the condition of the specimen, supposing its lower portion to have been enveloped by a basal spongy mass, as is the case with the most perfect specimens from Japan; and the gradual diminution in the size of the oscula (polypiferous orifices of the author) is quite in accordance with their characters as oscula of an extended cloacal appendage to a sponge of such a structure. In no. 3 the author describes the structure of the corium polypigerum, or coriaceous bark of Gray, in terms which apply equally well to the similar parts of *Hyalonema mirabile*, in which siliceous spicula are also abundant, intermixed with extraneous particles of sand; but the intermixture of the latter would greatly depend on its local surroundings while living. In no. 4 the granulated appearance of the surface of the corium is described as "due to the presence of an infinite number of regular spicula dispersed in masses and bristling with points." And in no. 5 he states that each polype is sustained by a siliceous structure of filiform spicula, disposed

longitudinally, and at equal intervals on the internal sides of the cavities.

Thus under the last two heads we have a description of forms of siliceous spicula and modes of their disposition in perfect accordance with well-known spongy organization; and in truth the whole of the author's descriptions of the Portuguese specimens are strongly in favour of their spongy nature, both as regards the material of which the spicula are composed, as well as in their mode of disposition on the outer surface of the corium or bark, which is in perfect accordance with the external defensive systems so frequently observed among sponges.

No specific characters of *Hyalonema lusitanicum* are given to distinguish it from *H. mirabile*; and it would not at all surprise me if, upon a further knowledge of the characters of the former, it were to prove to be the same species as the latter; no forms of spicula are given to enable us in the slightest degree to separate the one from the other.

Other naturalists have published works on *Hyalonema*—Prof. John Frederik Brandt of St. Petersburg in 1859, Prof. Max Schultze in 1860, and Dr. Leidy of the United States; but as I have not seen the specimens described by these authors I shall confine my observations to the type ones of the genus in the British Museum and others which I have had the opportunity of closely examining. The opinions of the authors who have written on these subjects vary considerably from each other; but none of them, I believe, entertained the idea that *Hyalonema* was neither more or less than a sponge in all its parts.

In 1860, while searching for new forms of spicula and other structural peculiarities of the sponges to assist me in the construction of a systematic nomenclature by which the species might be described, as plants are in botanical science, I became acquainted with the specimens of *Hyalonema* in the British Museum; and in the course of a minute examination of the one with the basal mass of sponge I found numerous forms of siliceous spicula which I had not before seen, and which I afterwards figured and described in the 'Philosophical Transactions of the Royal Society of London' for 1862. Figures 3, 4, 5, and 6 in plate 31, and figures 12, 20, 30, 34, 35, 36, 37, and 38 in plate 36, are all from the specimen in the British Museum; and the result of this examination of the specimen was a strong conviction that the whole of the parts formed but one animal, and that it was truly a sponge. This conviction I published in the third part of my paper "On the Anatomy and Physiology of the *Spongiadae*," in the 'Philosophical Transactions of the Royal Society' for 1862, p. 1113; and as the description of the genus given by Dr. Gray applied only to a part of the animal instead of to the whole of it, I deemed it necessary to enlarge the generic characters so as to embrace the whole of the most important parts of its structure, in the following manner:—

"Skeleton an indefinite network of siliceous spicula, composed of

separated elongated fasciculi reposing on continuous membranes, having the middle of the sponge perforated vertically by an extended spiral fasciculus of single elongated and very large spicula, forming the axial skeleton of a columnar cloacal system."

I did not attempt any description of its specific characters, as my object at that time was the description of generic characters only. I now propose entering fully upon the consideration of the minute structures of every part of this complicated and curious animal, and to endeavour to give such descriptions of them as may serve to distinguish it as a species from any other of its congeners.

HYALONEMA MIRABILE, Gray.

Sponge.—Massive, sessile. Surface even. Oscula mammiloid, more or less elevated; terminations depressed, corrugated in radiating lines, numerous, dispersed over the surface of a single central elongated cloacal column projected from the middle of the sponge upward; dermis of the cloaca coriaceous, thick, composed of two layers—outer layer arenaceous, inner layer spiculous; spicula acerate, and cylindro-cruciform, apically or entirely spinous, various in size and proportions: axis of the column a single large spiral fasciculus of very long fusiformi-acerate spicula, each extending from its base to near its apex; spicula asperated near the base. Skeleton lamelliform; spicula fusiformi-acerate, long and slender, apices obtusely terminated; or fusiformi-subcylindrical. Defensive spicula:—external inflato-fusiformi-acerate, hemispinous distally; spines ascending. Internal defensive spicula spiculated cruciform; spicular ray ascendingly and entirely spinous; cruciform rays spinous. Tension spicula inflato-acerate, long and very slender. Interstitial spicula attenuato-rectangulated, hexradiate, large and small; and fimbriated multihamate birotulate, in two systems: the primary one very large and stout; hami cultelliform, fimbriated at the base of the inner surface; shaft cylindrical, entirely tuberculated, tubercles stout; spicula dispersed. The secondary system:—spicula smaller than those of the primary one; hami very long, apices nearly meeting; neither fimbriated nor cultelliform, congregated. Interstitial spicula cylindro-cruciform, terminally or entirely spined; radii short and very stout; spines conical, acute, and very large. Retentive spicula quadrihamate, minute; hami simple, elongate, attenuated.

Colour, undetermined in the living state.

Hab. Japan.

Examined in the dried state.

The most perfect specimens I have seen are that in the British Museum (which has the long spiral cloacal column immersed in the basal mass of the sponge to very near its proximal extremity, as represented in the Society's 'Proceedings' for 1857, plate ix., Radiata), and two smaller ones now exhibited (see Pl. IV. figs. 1 & 2). For the loan of the first of these I am indebted to my friend Capt. C. Tyler, and for the second to the kindness and liberality of my friend Mr. Henry Lee. One other specimen in a similarly perfect state

of preservation is in the collection of the Bristol Museum. Numerous other specimens are now known, of which the spiral cloacal column alone has been preserved by the Japanese fishermen who took them; and of such specimens I have had nineteen in my possession. Of these, five had none of the coriaceous dermis around the spiral column. Three specimens from the collection of my friend Capt. Charles Tyler had portions of the basal mass of sponge closely adhering to the proximal end of the column, and one of these three has every appearance of having been accidentally withdrawn from the original basal mass of sponge some time previously to its being taken by the Japanese, as there is, about $\frac{3}{4}$ of an inch above the proximal end of the spiral column, a small bulbous mass of the sponge remaining, nearly an inch in length (Pl. IV. fig. 1). This small mass has secreted a new thin brown dermal membrane, which is continued upward for about an inch, closely surrounding the spiral column. It then throws out ten or twelve of the mammiform oscular bodies in the course of about another inch of its progress upwards, the remainder of the spiral axis being in a denuded state. The membrane surrounding the bulbous mass of sponge and that closely embracing the spiral column above it are continuous and identical in structure, thus affording unmistakable evidence of their forming parts of one and the same animal. The specimen represented in Pl. IV. fig. 2 has the spiral column enveloped by the corium from its junction with the distal end of the basal sponge for about 2 inches upward, but it does not enter its substance. The dermal membrane of the sponge is entirely wanting.

Two of the nineteen specimens had their distal terminations entirely covered by the coriaceous dermis of the column; and several of them had the thinning off of the proximal extremity of the dermis of the column at the point of its junction with the thin dermal membrane of the distal end of the basal mass of the sponge; so that between the whole of the specimens there is no part of the entire sponge which is not duly represented.

The basal mass of the sponge in the British Museum collection is of a compressed massive form; it is $5\frac{1}{2}$ inches in height, $3\frac{3}{4}$ inches in width, and nearly $1\frac{1}{4}$ inch in thickness; the total height, including the cloacal column, is 20 inches. The base of the spiral axis of the cloacal appendage is at or near the base of the sponge; and it passes thence in a vertical direction through its substance, emerging at its distal extremity. The surface of the spongy mass has every appearance of having been smooth and even.

The great cloacal organ and its oscula are exceedingly interesting in their structure. While the spiral axis of the cloaca is surrounded by the basal spongy mass, it has no dermal investment of any kind; but as soon as it emerges from its distal extremity the thin dermal membrane of the sponge is continued over the surface of the column, and gradually thickens in its course upward, until it assumes the form of a stout coriaceous investment, and it then becomes composed of two distinct layers, the outer one being thickly studded with grains of sand and other extraneous substances, which do not

appear to touch each other, but are separately enveloped by keratode in the manner that is so prevalent in the genus *Dysidea*, Johnston. The inner layer has few such adventitious matters imbedded in it; but in place of such material there are numerous cylindro-cruciform and other siliceous spicula dispersed throughout its whole length. From this thick coriaceous dermis the oscula are projected abundantly; they are dispersed over its surface without any appearance of order. In some specimens they are nearly uniform in size, seldom exceeding about a line in height, while in others they vary in that respect to a very considerable extent. In one specimen in my possession a few only are as short as a line, while others vary from 6 lines in height to scarcely an elevation of the apex of the organ above the dermis of the cloaca. The apical terminations of these organs also vary considerably; they are more frequently slightly oval than circular, and in many instances they are quite as much oval as those figured by M. Barboza du Bocage from his *H. lusitanicum*, described in the Society's 'Proceedings' for 1864, p. 264.

I cut off the corrugated apical portion of several of these oscular bodies and mounted them in Canada balsam: the outer surface in most of them was so thickly studded with closely adhering grains of sand that no part of the dermal surface could be distinctly seen; but in some the central orifice was partly open, and the radiating structure was more than usually distinct. In these specimens it was apparent that the radiating ridges within the outer surface do not extend from the circumference to the centre, but only to the outer margin of a central circular membrane with concentric lines of minute corrugations. These structures, therefore, have every character of contractile organs, supplying the place of muscles, so as to enable the animal to open and close the oscular orifice at its pleasure. Within the outer portion of the apex of the osculum, at about the distance of one-third or one-fourth of its diameter, there is situated a second membranous diaphragm, of much less complicated structure than the outer one. This also was not entirely closed; the inner margin of this membrane also exhibited a series of numerous concentric corrugations, forming a flat circular band around the orifice, from the outer margin of which lines of thickened membrane radiated towards the outer margin of the organ; and they gradually expanded laterally, uniting and forming the extreme circumference of the perforated diaphragm, thus exhibiting a series of contractile membranes for the opening and closing of the inner diaphragm in a similar manner to that of the outer one. The radial lines of the inner diaphragm do not correspond with those of the outer one, and they are not so numerous. The apical and the inner diaphragms are connected by a circular series of dissepimental membranes, the planes of which are at right angles to the upper and lower diaphragms; so that the internal aspect of this complicated valvular structure bears no very distant resemblance to the dissepimental structures of many seed-vessels of plants, supposing sections at right angles to their axes to have been made. Sections of this valvular structure in its natural condition are represented in Pl. IV.,

fig. 3 representing a view of the interior of the distal portion of a section through the middle of the valve at right angles to the central axis of the oscular tube, by direct light; fig. 4 represents the proximal diaphragm of the same specimen mounted in Canada balsam. The action of these two valvular diaphragms appear to be more or less independent of each other; and the radiating motive fibres, comparatively few in number and very different in their structure from those of the apical valve, are readily visible in their natural condition when immersed in water or Canada balsam. This is not the case with the motive organs of the more complicated apical valve, which are deeply immersed in the substance of the apical diaphragm, and which cannot be displayed until the internal dissepimental structures and the membrane above, which covers them, are removed by the action of a solution of caustic potass for about eight hours—Brander's solution one part and distilled water three parts being of about the required strength. When these impediments have been removed, the series of motive fibres present a very interesting appearance. The whole consists of numerous spindle-shaped fibres, one end of each being attached to the outer circumference of the corrugated apical area, and the other end to the inner circle of the same part, leaving a circular inner area of transparent membranous structure, the middle of which has the natural orifice of the osculum in its centre, usually in a closed and puckered condition. This parallel radial series of motive filaments, represented in Pl. IV. fig. 5, is doubtless not in its natural condition, the action of the potass having probably increased the motive filaments to two or three times their natural diameter; so that, when in this state they are forced by pressure or other means through the outer orifice of the osculum, they may have been very readily mistaken for tentacula. The radial motive fibres in the specimen under consideration appear to consist of a strong external membrane filled with dense amber-coloured keratode, apparently the same substance as that of which the corium is composed. The inner membrane, covering the under surface of this radial series of fibres, is apparently a much more delicate tissue than that of the dissepiments of the valvular structure beneath; and the fragments disrupted by the action of the potass are crowded with minute elongated spiral cells; but these cells are not peculiar to this portion of the membranous structures of the corium, as I have found them also in parts of that organ which were not connected with the oscular tubes. Their position, immersed deeply in the sarcodous membrane lining the inner surface of the apical valve, and closely covered by the distal end of the dissepimental structures, and also completely immersed in the sarcodous membrane of the inner corium, would seem to indicate them to have some other office in the economy of the animal than that of urticating organs as suggested by Prof. Max Schultze.

In the membrane forming the inner diaphragm, and in the parietes of the tubular part of the osculum, there are frequently found cylindro-cruciform and other spicula of the same description as those imbedded in the inner corium. These peculiar forms of spicula

imbedded in such large quantities in the latter tissue might, by a great stretch of imagination, be thought to have been selected from other extraneous matters around and thus appropriated; but this solution of their presence in the valvular structure of the supposed polype, deeply imbedded in its sarcodons membranes, is certainly inadmissible. In the valvular structures they are in a position in which secretion alone can account for their presence; and their appearance under such circumstances incontrovertibly connects them with the corium on which the so-called polypes are based; so, in like manner, their abundant presence in the inner corium, and still more profuse occurrence in the basal sponge, connects the corium and basal sponge unmistakably together. We have therefore, by means of these peculiar and very striking forms of spicula, a sequence of proof of a most conclusive character that the whole of the structures present in the most perfect specimens of *Hyalonema* are parts of one and the same animal.

Professors Brandt, Boeage, and Max Schultze, in their respective papers on *Hyalonema*, believed that they had detected tentacula within the heads of the oscular projections; and the former two have each figured what they regard as those organs with powers of about 4 or 5 linear. The figures of the supposed tentacles of the first and second named authors differ exceedingly; and if each be correct, their supposed polypes cannot belong to the same genus. The former author does not seem to have much faith in the reality of what he depicts, as in the description of the figure 8. tab. 2, in his work, he writes, "quoad tentacula expansa idealis." I have no doubt that by soaking the oscular projections in a solution of caustic potass, and by pressure or a little clever manipulation on the softened and half-destroyed tissues of the valvular structure within them, their motive fibres, which pass inward from the inner surface towards the central diaphragm, may be loosened and withdrawn from the apical orifice, and so disposed by pressure or otherwise as to readily deceive an observer whose mind was previously occupied by a foregone conclusion.

I am well acquainted with the polype-cases of *Zoanthus couchii* in the form of *Dysidea papillosa*, Johnston. They are stout open tubes, composed of sand cemented together by animal matter, and they have nothing within them like the elaborate keratose valvular apparatus that we find in the distal ends of the oscular projections in *Hyalonema*; in fact their apices are permanently open when the polypes, their former occupants, are destroyed. Nor have they at any time any appearance of tentacles upon them. Those organs at all times appertain to the soft retractile polypes, and not to the polydroms that they inhabit. It has been suggested that *Hyalonema* really consists of the basal spongy mass, the spiral column of spicula, and the inner sheath that surrounds it; while the outer sheath is a parasitical Zoanthoid Coral. But a careful examination of the two sheaths surrounding the column affords such evidences of the identity of their structures as to forcibly negative this supposition.

The peculiarities of the structures of these oscular organs somewhat resemble those of the inhalant organs of *Geodia Barretti*, described and figured in the 'Philosophical Transactions of the Royal Society' for 1862, pl. 32. figs. 3, 4 & 9a, pp. 788, 792, 794, and also in 'Monograph of British Spongiadæ,' pl. 19. figs. 301, 302, and pl. 28. f. 354a.

The spicula forming the spiral column of the sponge are the longest organs of this description that I have ever seen. They are composed of numerous concentric layers, and are very similar in their structure to the large spicula in *Tethea cranium* or *Euplectella aspergillum*, Owen. The asperation of the bases of the spicula is usually produced by a partial desquamation of the concentric layers, apparently for the purpose of giving the base of the column a stronger adhesive power to the central mass of the sponge. In form they are identical with those of the skeleton fasciculi of the basal mass of sponge, but vastly enlarged in their size and proportions to adapt them to their own especial office in the economy of the animal. The normal condition of these spicula is that of smooth cylinders; but when immersed in the basal mass of the sponge, and also in the lower part of the corium, they undergo a remarkable alteration in shape, assuming very frequently the form of the well-known structure of the hairs of the Bat. In this case the alteration in form is effected by the projection of a series of thin superposed layers of membrane following each other, and secreting silex rapidly and increasingly as they advance, until, each having progressed about the space of 4 or 5 diameters of the central spiculum, they terminate abruptly with a strongly denticulated margin. The silex intervening between the external coat of these coronated masses and the surface of the axial spiculum is not composed of concentric layers as in the latter, but it is as solid in appearance as a mass of glass, as represented (Pl. V. figs. 16, 17).

These curious forms may be seen deeply moulded in the substance of the lower part of the inner corium in which such spicula have been imbedded. This singular structure is apparently to endow that portion of the spiculum with greater prehensile powers than could be obtained by a more or less amount of desquamation of the proximal portions of the spiculum.

The curious cloacal column of this sponge is not without a parallel in the history of the *Spongiadæ*, as in the British genus *Ciocalypta*. In *C. penicillus* we have a series of cloacal columns projected from the basal mass of the sponge, each of which has a central axis of spicula connected together in a longitudinal direction, which extends from the base to the apex of each of the columns. A rather stout dermal membrane envelopes each of them, but is not closely adherent to the central axis as in *Hyalonema*; on the contrary, it is supported from contact with it by a series of short stout pedicels of spicula, the bases of which are immersed in the central axis, and their apices radiate in every direction, forming at their junction with the dermal membrane a most effectual support to it. The spaces between the central column and the dermal membrane, when seen by the aid

of the microscope, closely resemble a beautiful and elaborately constructed Gothic crypt. In this sponge the oscula are simple orifices, not projecting beyond the dermal membrane as in *Hyalonema*. But the same purpose prevails in both descriptions of cloacal organ, that of discharging the fæcal matters at a distance from the inhalant surface of the sponges. A section of one of the fæcal columns of *Ciocalypta penicillus* is represented of the natural size in the 'Philosophical Transactions of the Royal Society of London' for 1862, pl. 73. f. 4; and a magnified view of a portion of the same column is represented by fig. 5; and also in 'Monograph of British *Spongiadæ*,' vol. i. pl. 30. figs. 360 and 361.

Elongated cloacal projections from sponges are by no means uncommon organs. In large specimens of *Halichondria panicea* and several other British species of sponges such organs are frequently put forth; but in these cases the distal extremity is always open, and the production of these organs are the exception, not the rule: but the contrary is the case in the British genus *Polymastia*, very similar in its skeleton-structure to *Alcyoncellum*, Quoy et Gaimard (*Euplectella*, Owen, Trans. Zool. Soc. Lond. vol. iii. p. 203).

In *Polymastia mammillaris* (*Halichondria mammillaris*, Johnston) there are frequently on a single specimen from forty to fifty of these cloacal organs, springing from a sponge about 2 inches in length and breadth and not $\frac{1}{2}$ inch in thickness, but attaining 1 inch in height, with a diameter of rarely more than 2 lines, the distal terminations being always closed; the minute oscula are dispersed on all parts of the cloaca, as in the corresponding organ in *Hyalonema*. Other British species of the same genus approach still closer to the form and peculiarity of *Hyalonema*. In *Polymastia spinula* the basal portion is exceedingly thin; and the cloacal projections, seldom exceeding two in number, are about an inch in length, being in height at least twenty times the length of the thickness of the basal sponge.

In a third species of the same genus (*P. bulbosa*) we have a still closer approach in form to *Hyalonema*, the basal mass of the sponge being bulbous, in the form of a small onion, with a single long slender cloacal tubular appendage crowning its summit, with a length rather greater than the height of the bulbous mass beneath it (Monograph of British Sponges, vol. ii. p. 61). The structure of the column of *Hyalonema*, considered as a sponge, is not so anomalous as it at first appears. In truth it is only one of several varieties of such cloacal appendages, all of which approximate closely to each other in form. In *Polymastia* we have the cloacal organ hollow and closed at its apex, but supported by an external network of siliceous spicula, with the oscula dispersed over its surface. In *Euplectella aspergillum*, Owen, the skeleton is very similar to that of *Polymastia*, with the difference of the oscula being congregated at its distal extremity. In *Ciocalypta* the cloacal organs closely approximate to those of *Hyalonema*. Their parietes are thin, like those of *Euplectella*, Owen, with a central axis of spicula supporting the organ in an erect position; in *Hyalonema* the spicula composing the column are exceed-

ingly long and comparatively few in number, and do not appear to be connected with the parietes of the organ; while in *Ciocalypta* they are short and very numerous, and the axis is connected with the sides of the cloaca. Thus, when we consider the spiral column and its delapidated dermal coating alone, as it is usually received from the Japanese, and without reference to the basal mass of sponge belonging to it in its natural condition, the species presents an exceedingly anomalous appearance; but when the entire animal is considered and compared with other sponges, the anomaly is dissipated, and it is seen to present very few anatomical and no physiological differences from a numerous series of well-known sponges.

The dermal membrane of the basal portion of the sponge in the British Museum has been nearly entirely destroyed, a few fragments only remaining *in situ*. It appears to have been thin, pellucid, and aspiculous, or with a few adventitious spicula attached to its surface. The numerous inflato-fusiformi-acerate external defensive spicula do not appear to perforate it in the natural condition of the sponge; but the fragments of the membrane *in situ* were so small as scarcely to allow of speaking on this point decisively.

The spicula of the skeleton are exceedingly variable in length and proportions, and are often curved to a very considerable extent, or they are flexuous; and amongst them there are occasionally found exceedingly large fusiformi-acerate spicula, the diameters of which are equal to that of six or seven of the ordinary spicula of the skeleton; and at irregular intervals we find very large attenuato-rect-angulated hexradiate spicula, which probably served to connect the flakes or layers of the skeleton together (Pl. V. fig. 1 a).

I found but one small group of the external defensive spicula *in situ*; but this was exceedingly characteristic. The spicula (Pl. V. fig. 5) are very numerous and closely packed together in parallel lines, and they are apparently projected about half their length beyond the outer surface of the mass of the skeleton. These spicula represent the shaft of an attenuated rectangulated hexradiate spiculum, with the inflation at about the middle of the shaft, whence the four lateral radii of that form of spiculum would spring. But the striking peculiarity of their structure is the mode of their adaptation as external defensive spicula, by the projection from all parts of the distal half of the shaft of numerous small spines at ascending angles of about 20 degrees to the long axis of the spiculum; while on the proximal half of the spiculum there is rarely even the rudiment of a spine to be detected. The central inflation of the spiculum is usually projected beyond the external surface of the mass of the skeleton. A secondary series of defensive spicula are projected from the surface of the mass of the skeleton, and these consist of spiculated cruciform spicula ascendingly and entirely spinous. They are also exceedingly numerous, their cruciform bases all being nearly in the same plane, and their spicular radii nearly parallel to each other, the apices reaching to about the central inflations of the large external defensive spicula. These secondary external defensive spicula are in reality the internal defensive spicula of the sponge. They are perfectly novel in their

form, and are of a complicated and very interesting structure. They consist of a short stout cruciform base, with a long spicular ray ascendingly and entirely spinous, projected at right angles from the centre of the basal radii. The spines on the spicular ray are similar in form and mode of disposition to those of the external defensive spicula, but very much longer in proportion to the size of the spiculum, frequently exceeding in their length the diameter of the shaft on which they are based (Pl. V. fig. 6, and fig. 1*b in situ*).

The radii of the cruciform bases are also slightly spiculated towards their apices. They are thickly distributed on the fasciuli of the skeleton, and frequently equally so on one side of the interstitial membranes, probably that which forms the surfaces of the interstitial spaces, and they are especially abundant near the exterior of the sponge.

The four basal radii appear firmly cemented to the membrane—but not immersed in its substance, as they do not appear to leave their impression when removed from it, nor do they bring any portion of the membrane away with them.

In some part of the tissues these spicula are very much modified in form. In ordinary cases we find the basal radii short and stout, and not more than a fourth or a fifth of the length of the spicular ray; while in other cases the basal rays are very nearly as long as the spicular one, the only difference in their structure being that the latter is very strongly spinous, while the former have the spines comparatively very slightly produced.

The interstitial membranes, when not covered with spiculated cruciform spicula, are often abundantly furnished with long slender flexuous acerate tension spicula, with a central inflation indicative of their being an incipient condition of either rectangulated hexradiate or rectangulated triradiate forms; and the latter one occasionally is found amongst them (Pl. V. fig. 7).

The interstitial spicula of this sponge are very numerous, and exceedingly various in size and form. They are of three very distinct descriptions:—first, rectangulated hexradiate, large and small (Pl. V. figs. 8, 9); second, fimbriated multihamate birotulate (Pl. V. figs. 2, 3); and third, cylindro-cruciform (Pl. V. figs. 10, 11, 12, 13, 14).

The first of these forms abound immediately beneath the apparent line of the dermal membrane in the large basal mass of the sponge; the greater portion of them are large, and they are disposed with a considerable approach to regularity, and amongst them there are frequently groups of the smaller variety of this form (Pl. V. fig. 8). They are also rather abundant near the basal portion of the spiral column of the cloacal system of the sponge, and they are found more sparingly dispersed in all parts of the basal mass. Generally speaking the whole of the six radii are fully produced; but occasionally pentradiate forms are found.

The second form or fimbriated multihamate birotulate spicula are generally found dispersed amid the interstitial tissues of the large basal mass of the sponge. There are usually not more than one or

two together; but occasionally they occur in groups of ten or twelve, without any approach to a definite arrangement (Pl. V. fig. 1). These spicula are comparatively large and stout. They have eight rays at each end of the shaft, the two groups of radii curving towards each other to such an extent that each forms the half of a regular oval figure, the opposite apices being separated to the extent of about the length of one of the radii. Each ray is in form like a double-edged obtusely pointed knife bent near the handle in the direction of a line at right angles to the inner surface of one of its flat sides; and each ray is strengthened and connected with the shaft of the spiculum by a stout curved web of silex, which extends from a little below the inner surface of the ray to a point on the shaft about opposite to its middle. The edges of each ray are also slightly curved inward (Pl. V. fig. 2). The smaller or secondary system of birotulate spicula differ somewhat from the larger ones in structure. They are not fimbriated at the base, as those of the larger ones are, nor have the radii the same distinct cultelliform figure (Pl. V. fig. 3). Their position in the sponge is also different. The larger ones are always irregularly dispersed; while those of the smaller system are usually congregated in considerable numbers around the large skeleton-fasciculi, their direction being coincident with the axial line of the fasciculus (Pl. V. fig. 4); a few, comparatively, are dispersed, but this mode of position appears to be rather the exception than the rule. The shaft is cylindrical, and has short stout tubercles dispersed over all its parts, and the radii are so long in their proportions that the opposing apices very nearly touch each other.

The third form of interstitial spiculum, the cylindro-cruciform one (Pl. V. figs. 10, 11, 12, 13, 14), appears to appertain more especially to the cloacal system; they are found abundantly dispersed near the inner surface of the coriaceous dermis of the spiral column of the sponge; but they occur in by far the greatest number between the basal portion of the spicula of the spiral column, and in their immediate neighbourhood, intermixed with the large hexradiate spicula of the interstitial tissue of the great basal mass of the sponge; and at the top of this mass the spiral column is surrounded by a profusion of them.

The radii are short and very stout in their proportions, their length varying from twice to five or six times their own diameter; and the four rays are frequently of different lengths. They are profusely covered with large, stout, more or less conical spines, and especially so at their distal extremities. In all these characters they vary to a considerable extent even in the same group. They appear to be more matured in the basal portions of the sponge than in the coriaceous dermis of the spiral column; in the latter position they are frequently represented by short, stout, entirely spined cylindrical spicula (Pl. V. fig. 10); but between this rudimentary state and the completely cruciform spiculum specimens may be found in every intermediate stage of development. Occasionally a spiculum may be found with a fifth ray, indicating that the cruciform spiculum is in truth only a modification of the regular hexradiate type of the inter-

stitial spiculum (Pl. V. fig. 14). The occurrence of this peculiar form of spiculum in the inner surface of the coriaceous dermis of the spiral column, and also dispersed amid the tissues of the basal mass of the sponge, unmistakably connects the two as portions of the same individual.

The quadrihamate spicula are a variety of form that I have not seen before. The hami are comparatively very long and slender. They are exceedingly minute, requiring a linear power of at least 700 to define them well. They are irregularly and rather sparingly dispersed on the interstitial membranes (Pl. V. fig. 15).

From the few patches of sarcode remaining attached to parts of the skeleton, it is probable that it has been both dense and abundant. The fragments preserved are of a deep amber-colour.

It is probable that there are more species of the genus than the one described above, as among the material brought up from 2200 fathoms by the soundings in the Indian Ocean, from the 'Herald,' I have seen three distinct varieties of form of multihamate birotulate spicula of a very similar size and character to those found in *H. mirabile*, but with such structural variations as to indicate their origin in different species.

The internal structures of this sponge are strongly indicative of carnivorous habits. The loosely constructed reticulated skeleton would readily admit of the entrance of small annelids; and when once within the precincts of the sponge their escape would be almost impossible. The powerful cultelliform radii of the finbriated birotulate spicula entering their bodies would securely hold them as prey; and every writhing effort they made would contribute to their destruction by a succession of impalements on the spiculated rays of the numerous spiculated cruciform spicula around them, bleeding them to death from numerous punctured and lacerated wounds for the nutrimentation of the sponge; and it will readily be seen that every one of these elaborately constructed organs that I have described are admirably adapted to the purposes that I have assigned to them.

I cannot agree with Dr. Gray in considering *Hyalonema* as allied to either the *Gorgoniadæ* or the *Zoanthidæ*. We know of no compound polypidom, among the *Coralliidæ* or *Zoanthidæ*, or any other division of Zoophyta, in which there is any approach to the secretion of a siliceous skeleton. In all of them, however varied the form may be, that part of the animal is either purely keratose or kerato-calcareous, while in *Hyalonema* the whole of the skeleton is siliceous; and this fact alone should have served to distinguish it from *Gorgonia*. I do not know of any zoophytes which have tentacula upon the polype-cases instead of upon the retractile polype; and in *Zoanthus* their position is undoubtedly upon the latter-named part of the animal. The form of the oscular mamillæ on the spiral cloacal appendage of the animal is very like the polypidom of some *Gorgoniæ*; but this similarity is not enough to justify the assumption that it belongs to that tribe of zoophytes, especially as, in *Pachymatisma Johnstonia* and other sponges, we find

the oscula simulating the forms of the polypidom of many species of *Gorgonia*.

The genus *Grantia*, with its calcareous skeleton, affords perhaps among the *Spongiadae* the nearest approach to the structure of the *Gorgoniadae*; but there is no possibility of confounding these sponges with any known species of that group; while, on the contrary side of the question, the basal portion of *Hyalonema* is nearly assimilated by the peculiarities of the structure of its spicula with the genera *Acyoncellum*, Quoy et Gaimard, and *Dactylocalyx*, Stutchbury; and the singular cloacal appendage projected from the midst of the sponge has its physiological and, to a certain extent, its anatomical parallel in our British genus of sponges, *Ciocalypta*. That the long spiral spiculous extension, or cloaca, of *Hyalonema* is intimately connected with, and forms a part of, the skeleton of the sponge cannot reasonably be doubted after a careful examination of the large specimen in the British Museum, in which it will be seen that the skeleton of the basal portion of the sponge enters between, and embraces the long fibres of, the spiral organ, without the intervention of any part of the thick sandy cortex. This dermal coat in the British Museum specimen is in good preservation for several inches in length above the spongy mass at its base; but not a vestige of it remains within the mass, nor is there any space between it and that portion of the spiral column passing through it that serves to indicate that it had ever been present in that position; on the contrary, the sponge embraces the base of the column closely and completely. But if any further evidence of their organic connexion were needed, we have it abundantly furnished by Capt. Tyler's specimen (represented in Pl. IV. fig. 1), in which it is seen that the dermal membrane of the small mass of basal sponge is continued from its distal end up the column, and that it is from this continuous membrane embracing the spiral column that the protuberant oscula are given off. In the specimen represented by fig. 2. Pl. IV. the distal end of the basal sponge and the proximal one of the corium are coincident in their terminations, and it is distinctly observable that no part of the corium enters the basal mass of sponge.

I have not seen the specimen of *Hyalonema mirabile* in the Bristol Museum; but I am informed by my friend Capt. Charles Tyler, who has seen it, that it has a basal mass of sponge very like that of the British Museum one. From portions of the basal mass of the Bristol Museum specimen, presented to Capt. Tyler at the time of his inspection of it, I have obtained precisely the same forms of spicula that exist in the basal portion of the British Museum specimen. I have before stated that, among the specimens in the collection of my friend Capt. C. Tyler, there were three of the spiral columns that had portions of the basal mass closely adhering to them; and on microscopically examining these portions of the sponges they were found to agree in their organization in every respect with the structures obtained from the two larger and more perfect specimens of the sponge, and also with that represented by fig. 2. Pl. IV. No reasonable doubt can therefore be entertained that these specimens

are all of the same species, and that the basal mass and the spiral cloacal organ are truly parts of the same individual.

The external mammillated coriaceous dermis of the cloacal system in the dried condition closely embraces the spiral column of spicula, but I could not detect any organic connexion between them. It is probable, from its reticulated structure in some parts, that there was a considerable intervening space between the spiral column and the external envelopment while in the living state, and that the present condition is due to the contraction of the coriaceous coat while drying.

DESCRIPTION OF PLATES IV. & V.

PLATE IV.

- Fig. 1. *Hyalonema mirabile* in the cabinet of Capt. Charles Tyler, having a small basal mass of sponge covered with the dermal membrane, which is continued up the spiral column, and from which protuberant oscula are put forth. Natural size.
- Fig. 2. A specimen of the same species of Sponge presented to me by Mr. H. Lee. The basal mass of sponge is without the dermal membrane, but having the commencement of the corium corresponding with the distal end of the spongy mass. Natural size.
- Fig. 3. A section at right angles to the long axis of one of the oscular organs, just below the corrugated terminal disk, exhibiting a view of the interior of the upper portion of the dissepimental form of the complicated valvular structure within the apical termination of the oscular tube. The central membrane containing the natural orifice is slightly involved, showing on its outer surface a portion of the sand imbedded. By direct light, magnified 50 times linear.
- Fig. 4. The lower portion of the valvular structure of the same section, showing the inner diaphragm, or valve, with its motive filaments. The valve partly open, and its membranous structure having a cruciform spiculum imbedded in its substance at *a*. By transmitted light in Canada balsam, magnified 50 times linear.
- Fig. 5. The apical termination of one of the oscular tubes cut off immediately beneath the corrugated apex, after maceration in solution of potass, showing the circular arrangement of the motive fibres of the outer valve of the osculum *in situ*, and the attachment of their apices to the outer margin of the central oscular membrane, their basal portions curving downward at the outer margin of the corrugated apex of the organ to their respective basal attachments. Mounted in water and viewed by transmitted light, magnified 50 times linear.

PLATE V.

- Fig. 1. One of the lamellæ of the skeleton from the basal mass of sponge of *Hyalonema mirabile* in the British Museum, exhibiting the general structure of the skeleton and the mode of disposition of the fimbriated multihamate birotulate spicula, the spiculated cruciform, and the various forms of interstitial spicula. *a*. One of the largest of the attenuato-rectangulated hexradiate interstitial spicula *in situ*, with a group of three fimbriated multihamate birotulate spicula, and spiculated cruciform spicula dispersed on the transparent interstitial membranes. *b*. Skeleton-fasciuli, with a row of spiculated cruciform spicula based on one of them. Magnified 50 times linear.
- Fig. 2. A fimbriated multihamate birotulate interstitial spiculum of the primary system. Magnified 175 times linear.
- Fig. 3. An elongo-recurvate dentato-birotulate interstitial spiculum of the secondary system. Magnified 308 times linear.

- Fig. 4. A group of the same form of spicula as No. 3, *in situ* around a skeleton-fasciculus, from the specimen of *Hyalonema* in the Bristol Museum. Magnified 108 times linear.
- Fig. 5. An inflato-fusiformi-acerate external defensive spiculum hemispinous distally. Magnified 108 times linear.
- Fig. 6. A spiculated cruciform internal defensive spiculum. Magnified 175 times linear.
- Fig. 7. Inflato-acerate tension spiculum. Magnified 108 times linear.
- Fig. 8. Large attenuato-rectangulated hexradiate interstitial spiculum. Magnified 90 times linear.
- Fig. 9. Small attenuato-rectangulated hexradiate interstitial spiculum. Magnified 90 times linear.
- Figs. 10, 11, 12, 13, 14. Various states of development of the cylindro-cruciform interstitial spicula, common to the basal mass of sponge and the coriaceous investment of the spiral column of the cloacal system. Magnified 175 times linear.
- Fig. 15. Attenuato-rectangulated triradiate tension spiculum, occasionally found dispersed among the other tension spicula. Magnified 90 times linear.
- Fig. 16. Asperated or jointed condition of portion of the long acerate spicula of the spiral axis of the cloacal system. Magnified 108 times linear.
- Fig. 17. A detached joint from a specimen similar to that represented by fig. 16, from which a portion has been fractured longitudinally, exhibiting the uniform solidity of the incrusting silex. Magnified 108 times linear.
- Fig. 18. Quadrihamate retentive spiculum.

5. Note on the Identity of certain Species of *Lycenidæ*.

By ARTHUR G. BUTLER, F.Z.S.

An observation in the second part of Mr. Hewitson's valuable work on 'Diurnal Lepidoptera,' p. 53, has induced me to compare the description of *Hesperia freja*, in Fabricius's 'Entomologia Systematica,' iii. p. 263. n. 19, with the numerous specimens of *Lycenidæ* in the collection of the British Museum; and I am now fully satisfied that this species, which Mr. Hewitson has placed provisionally at the end of the genus *Hypolycæna*, is perfectly identical with the well-known *Myrina jaffra* of Godart, figured in Horsfield's 'Catalogue,' pl. 3. figs. 5, 5 a.

The only apparent defects in the description given by Fabricius consist in the misapplication of the term *apex* to the anal area of the hind wings (a substitution of frequent occurrence in early descriptions), and in the somewhat loose account of the position of the transverse lines on the front wings,—the internal discal line, which in some specimens is almost submarginal, being described as central. The corrected description would be as follows:—

"*Magna in hac familia. Antennæ atræ. Palpi albi, apice nigri. Corpus fuscum. Alæ anticæ supra fuscæ, immaculatæ, subtus albæ limbo, lineola transversa discali strigæque postica fulvis. Posticæ fuscæ, areæ anali albæ fascia lata nigra. Caudæ duæ, anterior longissima alba, posterior brevior nigra margine albo.*
 "*Subtus albæ striga postica valde undata atra. Margo strigis fulvis nigrisque. Apex alæ prominat fascia lata, lute cærulea, quæ utrinque terminatur puncto magno atro.*"

There appear to be two distinct forms of this species, the less common one being, I believe, exclusively confined to Canara; it differs from the more widely distributed form (the true *Hesperia freja* of Fabricius) in having the subanal black band on the upperside of the hind wings nearly divided in the centre, thus forming two quadrate spots; on the underside it differs in the almost entire absence of yellow colouring in the front wings, and in the addition of a small intermacular subanal spot in the hind wings. I would suggest that the latter form should henceforth bear the name of *jaffra* (if it be worthy of any name at all), as this will prevent the possible addition of another synonym to Lycænidine nomenclature.

I believe that the insect figured by Mr. Hewitson, at pl. 21. f. 6, is the female of a very slight local variety* of *H. erylus* of Godart, as we have the male of it in the National Collection. *H. tmolus* of Felder may also prove to be nothing more than a local form of this insect †.

Trimen's *erylus* is the *philippus* of Fabricius (var. *certhis*, Doubl.). *Amblypodia selimnus* of Doubleday's list is represented by two shattered butterflies, one of which is the Ceylon form of the true *longinus* of Fabricius, and the other the Ceylon form of *pseudo-longinus* of Doubleday. These two species are placed as one by Mr. Hewitson; they differ as follows:—

IOLAUS LONGINUS, Fabricius.

♂. *Alis supra cæruleis nitidis, anticis area apicali et costa fuscis; posticis apice costaque fuscis, margine interno fusco-pallido: subtus fusco-albidis; anticis seriebus liturarum duabus, interna nigrarum, externa fuscicarum: posticis fuscis duabus marginalibus fuscis a venis interruptis; serie discali liturarum nigrarum valde irregulari; maculis duabus nigris analibus, interna angulum attingente, intus lunula flava cinctis, anali extus cæruleo rorata, puncto intermaculari cinereo. Exp. alar. unc. $1\frac{1}{16}$ — $1\frac{3}{8}$.*

♀. *Alis supra violaceis pallidis; marginibus costali, apicali et externa anticarum, et costali posticarum, fuscis; posticis linea marginali a venis interrupta, altera maculari submarginali tertique discali liturali nigro-fuscis; margine interno albido: alis subtus albidis, velut in mari scriptis, maculis autem posticarum analibus majoribus. Exp. alar. unc. $1\frac{1}{16}$ — $1\frac{3}{8}$.*

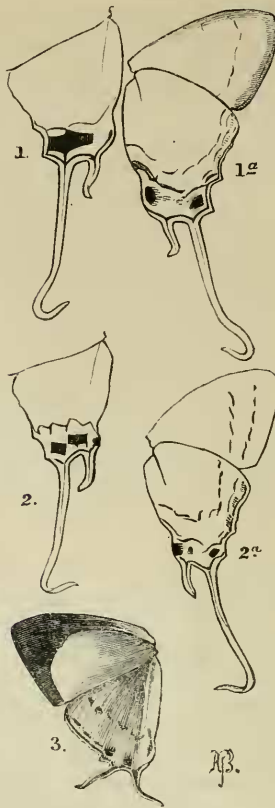
Hab. India.

IOLAUS PSEUDO-LONGINUS, Doubleday.

♂. *Alis viridi-cæruleis pallidioribus, posticis multo brevioribus, margine interno albido: alis subtus albidis, anticis seriebus liturarum apud costam minime arcuatis, interna posticarum*

* Our specimens, both male and female, differ from the typical form in the greater length of the hind wings and the more marked submarginal white line; the position of the bands on the underside is slightly altered; the male has the marginal black band on the upperside much wider at the apex of the front wings; and the front wings in the female have a straighter outer margin.

† This was at first Mr. Hewitson's opinion (*vide* Dirrn. Lep. ii. p. 49. n. 2).



Figs. 1. 1a. *Myrina freja*, Fabr.
 2. 2a. Local form, *jaffra*.
 3. *Iolans pseudo-longinus*, Doubl.

minus irregulari; maculis analibus parvis late flavo intus marginatis; puncto intermaculari albicante. Exp. alar. unc. $1\frac{7}{16}$ — $1\frac{1}{2}$.

♀. *Alis pallidioribus violaceis, anticis disco, et posticis apice albicantibus; posticis serie discali liturarum medium alarum approximante, serie submarginali maculari tenuiore, costa minus fusciscente: alis subtus velut in mari.* Exp. alar. unc. $1\frac{5}{8}$.

Hab. Java; Moulmein.

Var. *Posticis feminae serie liturarum discali serieque submarginali velut in I. longino positis.*

Hab. Ceylon.

I cannot but think that these differences are sufficient to warrant the separation of these two insects as constant and distinct local forms.

6. Description of a New Genus of Diurnal Lepidoptera belonging to the Family *Erycinidae*. By A. G. BUTLER, F.Z.S.

The species representing the present genus have hitherto been included in the genus *Taxila* of Westwood; they are, however, so strikingly distinct from it, that I think it absolutely necessary to separate them. The arrangement of the disco-cellular veins is very unlike that of either *Taxila* or the allied genus *Sospita*; the antennæ and wing-cells also differ in length. I therefore propose for this form the name of *Dicallaneura*.

The genus *Taxila* has hitherto contained three distinct forms, one of which must, I think, be henceforth placed with *Sospita*, as it shows a very great resemblance to the latter in neuration and in other less important structural details. These forms may be distinguished as follows:—

Genus TAXILA.

1. *Alæ subtrigonatæ; posticæ angulo anali producto et a cauda brevi tenui terminato; cella anticarum elongata, apice paulo concavo, posticarum breviora lata: corpus robustum, capite magno, antennis elongatis.*

1. T. DURGA, Kollar;

2. T. EGEON, Westwood; *cum aliis.*

2. *Alæ latæ, breves; anticæ subtrigonatæ, costa convexa, apice rotundato; posticæ margine postico convexo, sinuato (rarius medio minime producto*); cella anticarum brevi lata, apice paulo bisinuato, posticarum brevi, lata, venis disco-cellularibus specierum singularum plus minusve forma variantibus: corpus parvum, capite parvo, antennis brevioribus.—? SOSPITA, Hewit.*

1. T. DRUPADI, Horsfield;

2. T. ORPHNA, Westwood †;

3. T. THIUSTA, Hewitson;

4. T. TENETA, Hewitson; *cum aliis.*

DICALLANEURA ‡, gen. nov.

3. *Alæ latæ, breves, anticæ marginibus convexis; posticæ costa convexa, margine postico minime sinuato et post medium cauda obtusa producto; cella anticarum lata, brevi, apice valde excavato, posticarum lata, brevi, venis disco-cellularibus obliquis: corpus robustum, capite magno, antennis elongatis.*

* ♀. *T. drupadi*, Horsfield.

† Three species are confounded under this name.

‡ δικάλλα, νεῦρον.

1. *T. PULCHRA*, Guérin.
2. *T. DECORATA*, Hewitson. (Fig. 1.)

The allied genus *Sospita* (*Abisara*, Felder) contains three forms, all of them very similar in neuration, but differing in the form of the wings.

Genus *SOSPITA*.

Division 1.

Alæ posticæ cauda media cuneata.

1. *S. TANTALUS*, Hewitson ; (Fig. 3.)
2. *S. ECHERIA*, Stoll ;
3. *S. (ABISARA) KAUSAMBI*, Felder (= *præcedenti* ?) ;
4. *S. LYDDA*, Hewitson ; *cum aliis*.

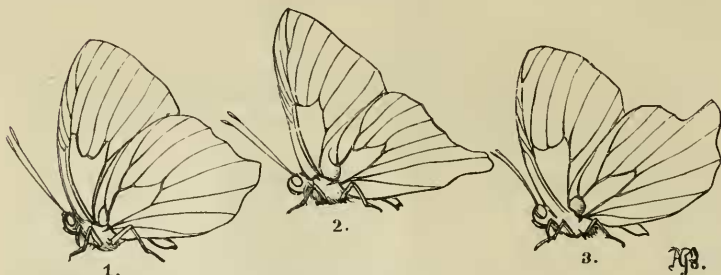


Fig. 1. *Taxila decorata*, Hewits.
 2. *Dodona onida*, Hewits.
 3. *Sospita tantalus*, Hewits.

Division 2.

Alæ posticæ cauda valde elongata media.

1. *S. SUSA*, Hewitson ;
2. *S. NEOPHRON*, Hewitson ; *cum aliis*.

Division 3.

Alæ magnæ, venis disco-cellularibus anticarum minime magis convexis ; alæ posticæ margine integro : corpus robustum, capite magno, antennis magis elongatis.

1. *S. FYLLA*, Hewitson.
2. *S. SEGECIA*, Hewitson.
3. *S. WALLACEI*, Hewitson.
4. *S. STATIRA*, Hewitson.

The genus *Dodona* is very closely allied to *Taxila*, the chief distinctions being as follows :—

Genus DODONA.

Alæ posticæ angulo anali magis producto, cauda obsoleta.

1. D. ADONIRA, Hewitson.
2. D. DIPGEA, Hewitson.
3. D. ONIDA, Hewitson. (Fig. 2, p. 38.)

7. Characters of Four New Species of Australian Land-shells.

By JAMES C. COX, C.M.Z.S.

HELIX RETIPORA.

H. testa perforata, lenticulari, undique valde et confertim costulato-striata, lineis concentricis minutissimis decussatis, quasi reticulata, solidula, nitidiuscula, rubro-cornea, subtus pallidior; spira late depresso-conoidea, obtusa, sutura mediocriter impressa; anfractibus 4, regulariter accrescentibus, planato-convexiusculis, ultimo mediocri, non descendente, infra convexo; apertura obliqua, fere rotundato-lunata; peristomate simplici, regulari, margine columellari supra dilatato, reflexo, umbilicum semitegente.

Diam. maj. 0·21, min. 0·17, alt. 0·11 unc.

Hab. Flinders Range, South Australia (*Masters*).

Allied, but not very closely, to *H. sericatula*, and not resembling any South Australian *Helix* yet described.

PUPA LINCOLNENSIS.

P. testa senistrorsa, rimata, elliptico-oblonga, tenuissime oblique striata, albida seu rufo-cornea; spira obtusa; anfractibus 6, convexiusculis, ultimo cæteros nequaquam æquante; apertura fere verticali, lunato-circulari; peristomate incrassato, expanso, albo, marginibus distantibus, columellari recto, sinistro supra obtuse angulato; pariete aperturali dente subcentrâli, prominente, obtuso, albo munito.

Long. 0·13, diam. 0·08 unc.

Hab. Port Lincoln, South Australia (*Masters*).

This belongs to the section or subgenus *Pupilla*.

BULIMUS MASTERSI.

B. testa imperforata, ovato-conica, solidiuscula, rugoso-plicata, ad suturam præsertim sulcis spiralibus interruptis sculpta, flavicante seu rufo-brunnea, fasciis (e lineis coalescentibus formatis) longitudinalibus plurimis albis quasi murreis ornata; spira parva, convexo-conica, obtusa, sutura impressa; anfractibus 4, modice convexis, ultimo spiram quater superante, basi

rotundato; apertura modice obliqua, angulato-ovali, intus fascias externas pallide exhibente; peristomate simplici, recto, tenui, margine columellari supra brevissime calloso, albo.

Long. 0·74, diam. 0·45 unc.

Hab. Port Lincoln, South Australia (*Masters*).

The coalescent porcellanous bands on a darker ground constitute the most prominent feature of this pretty species, whose nearest ally is *B. trilineatus* of Western Australia.

TRUNCATELLA SCALARINA.

T. testa imperforata, fusiformi-turrita, laevi, nitida, alba; spira decollata, sutura constricta; anfractibus 4 saltem, convexis, valde longitudinaliter et regulariter costatis, ultimo tres præcedentes æquante; apertura obliqua, oblongo-ovata; peristomate continuo, libero, calloso et expanso (supra præsertim), et infra fuciem bilabiatam exhibente, margine dextro curvato, infra rotundato, superiore fere recto; operculo —?

Long. 0·23, diam. 0·11 unc.

Hab. Port Lincoln (*Masters*).

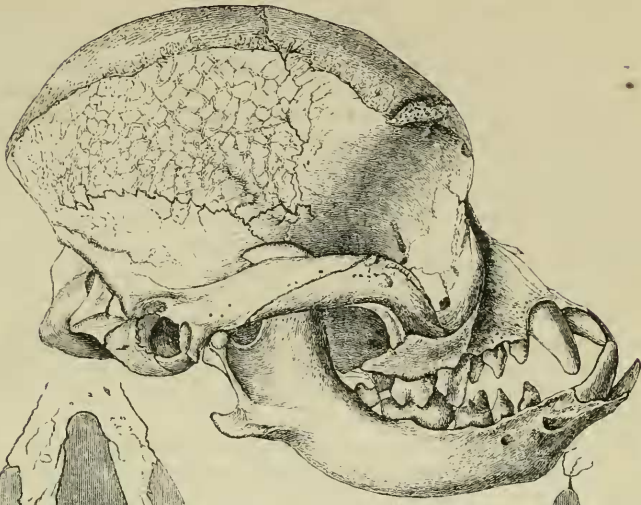
This remarkable shell, reminding one somewhat of a *Scalaria*, occurs in a semifossil state in the same district where the recent, smaller, and smoother *T. marginata*, Küster, appears to be plentiful.

8. On the Skull of the Chinese Pug-nosed Spaniel or Lap-dog. By DR. J. E. GRAY, F.R.S., V.P.Z.S., &c.

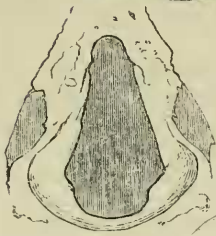
Dr. W. Lockhart has kindly presented to the British Museum the skull with the atlas vertebra attached, and the penis bone, of a "Chinese pug-nosed Lap-dog, of a breed greatly admired among the Chinese." The skull is peculiar for the very large size, broad ventricose and subcubical form of the brain-case, for the great shortness of the face, and the shelving, almost horizontal, position of the nasal apertures; the bones of the face are regular, symmetrical; the forehead is rather concave; the hinder part of the face and the back of the lower jaw are very broad behind; the nasal bones are well developed, and extend up behind between the orbits nearly to the forehead; the teeth are well developed and in good condition; the hinder parts of the tooth-line are very far apart, from the great breadth of the short palate; the two hinder upper grinders, which are under the front edges of the zygomatic arch, are placed angularly with regard to each other.

	in. lin.
Length of the skull	3 3
— of the brain-case	2 5
Height of the brain-case	1 9
Width of the brain-case over the ears	2 0
— of the skull over the zygomatic arches	2 10
— of the forehead behind the orbits	0 9

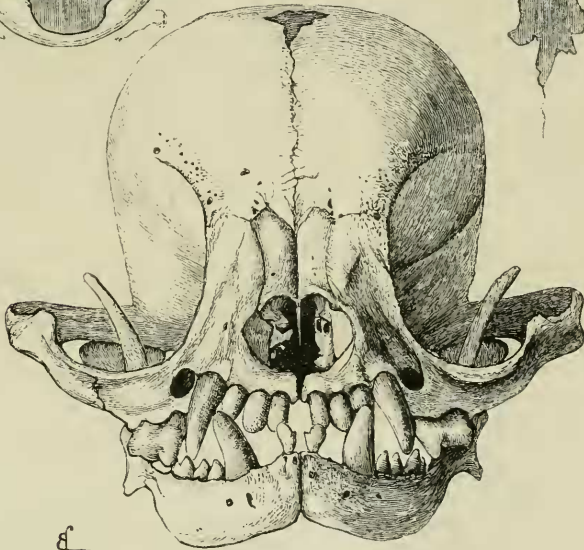
1.



4.



3.



g

2.

Skull of Chinese Pug-nosed Lap-dog.

Skull fully developed ; the ossification is imperfect, having a rather large irregular aperture or fontanel on the crown of the head between the parietal bones (fig. 3, p. 41). The occipital foramen is very large ; it is much produced upwards behind towards the crown ; the upper part is narrow, occupying the greater part of the height of the narrow supraoccipital bone, and on each side is a large half-oval aperture (fig. 4, p. 41). The lateral wings of the atlas vertebra are very large and broad, and much expanded behind.

The skull of an Italian Greyhound and of a Beagle in the British Museum have the foramen magnum large, and extending upwards in the supraoccipital bone towards the crown ; but the extension is much broader and shorter than in the Chinese Pug Spaniel, where it is narrower, and extends nearly to the upper edge of the supraoccipital bone.

These skulls also have an imperfection in the ossification, or a perforation, on the outer sides of the occipital bones and the squamous bone, but these are not quite so large as they are in the Chinese skull ; and in one of the skulls the right aperture is smaller than the other.

Miss Saunders of Reigate has a specimen of this Dog alive. It is a small long-haired Spaniel, with slender legs, and rather bushy tail curled up over its back. It differs from the Pug-nosed Spaniel called King Charles's Spaniel in the hair being much longer and more bushy, the tail closely curled up, and the legs being smaller and much more slender. The nose of the Chinese or Japanese Pug is said by some to be artificially produced by force suddenly or continuously applied : but that is certainly not the case in the skull that is in the British Museum ; for the bones of the upper jaw and the nose are quite regular and similar on the two sides, showing no forced distortion of any kind, such as is to be observed in the skulls of some Bulldogs ; for I believe that some "fanciers" are not satisfied with the peculiarity, and do sometimes try to increase the deformity by force.

Miss Saunders has sent me the following particulars of her dog :— "He is called a Japanese Pug Dog : they say he was the origin of the King Charles's breed ; but I do not know if this be correct. He is of a very jealous disposition, and timid, being afraid of the noise of a train, the popping of a coal from the fire, and any other sudden noise. He pretends to be very brave in attacking strangers or the gardeners ; but the moment they turn upon him he is off like a shot, till he is at a safe distance, when he barks loudly.

"When first he arrived from Japan (the spring of 1864) he would not tread on grass ; but he is now quite accustomed to our lawn, and will run about like other dogs. He prefers cold weather, and is always better in health, though, excepting once, he has never been ill since his arrival in England. He does not like strong light, his eyes looking watery and not quite open if he be in sunlight ; but of an evening his eyes look very large and bright ; and if in a good temper he will roll himself in the curtains or under our dresses, growling and barking with pleasure. Damp weather does not agree

with him ; and if his hair gets wet he is almost sure to take cold, unless thoroughly dried, which process he cannot bear. His temper is most uncertain, as he may be lying in your lap and quite peaceful, and if you touched him very likely he would snap ; he bites his best friends ; in fact he is a small tyrant, so we are more or less afraid to touch him. He feeds on cabbage-stalks boiled ; but in summer he likes cucumbers, both rind and inside ; this is his greatest delicacy. He will eat beetroot, lettuce-stalks, asparagus-stalks, white of egg, and fish : he is very fond of meat ; but we do not give him much, as we find a vegetable diet so much more wholesome for him. He has a trick of spinning round and round until he is apparently giddy, when he will roll over on his side and get up again ; he does this for his dinner or when he is hungry. He follows when we take him for a walk very well ; but being so small he cannot go fast, and it is a tedious process to get him along. If we have been away from home or out for a few hours he shows his joy by running about in a wild sort of way, snorting and wheezing ; but if we were to pat him he would bite us.

“He certainly does not appreciate the usual way people pet dogs, like patting, fondling, &c.

“His length of body is about 15 inches, and height about 10 inches.”

Dr. W. Lockhart has kindly sent me the following :—

“The Pug-nosed Dog, the skull of which I sent you, probably originated in Pekin and North China, and was taken thence to Japan, whence it was brought to Europe ; and thus this breed is called Japanese : I do not know whether you will agree with this idea, I merely state what I think is the fact of the case. There are two kinds of Pug in China :—one a small black-and-white, long-legged, pug-nosed, prominent-eyed dog ; the other long-backed, short-legged, long-haired, tawny-coloured, with pug-nose and prominent eyes. Sometimes in these dogs the eyes are so prominent that I have known a dog have one of his eyes snapped off by another dog in play. The preference for vegetable food is a fact ; but I think it is a result of education, as most of them will take animal food ; this is usually kept from them so that their growth and organization may be kept down. The sleeve dog is a degenerated long-legged variety of Pug rigidly kept on low diet, and never allowed to run about on the ground ; they are kept very much on the top of a kang or stove bed-place, and not allowed to run about on the ground, as it is supposed that if they run on the ground they will derive strength from the ground and be able to grow large. Their food is much restricted, and consists chiefly of boiled rice. They are very subject to corneitis and ulceration of the cornea from deficient nutrition. They exhibit very little personal attachment to the person who feeds them.

“From Mongolia a noble black dog, as large as a full-sized Newfoundland, is brought to Pekin ; he is used as a sheep-dog. From Shantung is brought a beautiful black, long-haired, long-backed, long-legged terrier, very much like a black Skye.”

9. On the Lepidopterous Insects of Bengal.

By FREDERIC MOORE.

[Continued from Proc. Zool. Soc. 1865, p. 823.]

(Plates VI. & VII.)

The first part of this "List of the Lepidopterous Insects of Bengal" appeared in the Society's 'Proceedings' for December 1865; and in it were enumerated 629 species, pertaining to the first three tribes of the order.

In the present and concluding portions the remaining tribes, viz. the Noctues, Pyrales, Geometres, &c., are treated of, and the names and descriptions of 960 species belonging to these groups are given, of which number about 250 are characterized for the first time.

For the specimens used in the compilation of this list I am mostly indebted to Messrs. A. E. Russell and W. S. Atkinson, of the Bengal Civil Service, both of whom kindly placed collections at my disposal, other species being contained either in the collections of the British Museum or in my own. All these have been compared with the species described by Mr. Walker in the British Museum Catalogues, the result of which has been the reduction of various generic and specific names of that author to the rank of synonyms.

The total number of species of the Lepidopterous Insects of Bengal that are recorded in this memoir in each tribe are as follows:—

Papiliones	409
Sphinges	50
Bombyces	387
Noctues	288
Pseudo-deltoides	27
Deltoides	34
Pyrales	73
Geometres	288
Crambices	18
Tortrices	7
Tineines	35
Total	1616

Tribe NOCTUES.

FAM. CYMATOPHORIDÆ.

Genus GONOPHORA, Bruand.

GONOPHORA INDICA, n. sp.

Pale fawn-colour: fore wing with the base uniform pale fawn-colour, bordered by an oblique silvery-white line, and traversed by a white basal streak, which is crossed by a narrow line; middle of the costa white, beneath which the wing is pale ferruginous, with delicate undulating transverse striae, and a series of four narrow pale-bordered darker zigzag discal lines, bordered externally by a sub-

marginal white band; a darker curved pale-inner-bordered streak before the apex; a marginal row of narrow pale lunules: hind wing darker fawn-colour, palest on the disk. Head, thorax, and abdomen pale ferruginous.

Expanse $1\frac{3}{4}$ to 2 inches.

Bengal. In Coll. A. E. Russell.

Genus *THYATIRA*, Hübn.

THYATIRA BATIS, Linn. Syst. Nat. i. 2. p. 286.

T. ALBICOSTA, n. sp.

Greyish brown: fore wing varied pinkish and greenish white along the costa, beneath which are numerous transverse narrow undulating dark-brown pale-bordered lines; two indistinct reniform discal marks; a curved streak beneath the apex, and a marginal undulating narrow line: hind wing with a discal and two subbasal pale bands; cilia greyish white. Head and thorax brown. Abdomen pale greyish brown.

Expanse $2\frac{3}{8}$ inches.

Bengal. In Coll. A. E. Russell.

Genus *OSICA*, Walk.

OSICA UNDULATA, n. sp.

Brown: fore wing dark ferruginous brown, suffused with grey broadly from posterior angle; numerous transverse blackish pale-bordered undulating lines, and a marginal lunulated line: hind wing brownish fawn-colour. Head and front of thorax dull yellow. Thorax grey. Abdomen pale brown.

Expanse $2\frac{1}{4}$ inches.

Bengal. In Coll. A. E. Russell.

Fam. *BRYOPHILIDÆ*.

Genus *BRYOPHILA*, Treit.

BRYOPHILA ALBISTIGMA, n. sp.

Greyish green: fore wing with darker transverse undulating pale-bordered lines; two dots within the cell and border of large reniform mark, submarginal and marginal row of spots silvery white, the latter row with black central dots: hind wing pale pinkish fawn-colour, with a narrow brown pale-bordered discal band. Body greyish green.

Expanse 1 inch.

Bengal. In Coll. A. E. Russell.

Fam. *BOMBYCOIDÆ*.

Genus *DIPHTERA*, Ochs.

DIPHTERA ATROVIRENS, Walk. Catal. Lepid. Het. B. M. xxxii. Suppl. ii. p. 614.

Darjeeling.

D. NIGROVIRIDIS, Walk. Catal. Lepid. Het. B. M. p. 615.

Darjeeling.

D. PRASINARIA, Walk. ib. p. 615.

Darjeeling.

D. VIGENS, Walk. ib. p. 616.

Darjeeling.

D. PALLIDA, n. sp. (Pl. VI. fig. 6.)

Pale sap-green : fore wing with spots along the costa, a short streak from the base below the costa, descending beneath and proceeding along the posterior margin and ascending irregularly upwards, beyond which are three streak-like spots ; at the extremity of the cell is a quadrate spot with pointed angles, beyond which is also a streak-like spot ; a transverse irregular line black ; the latter bordered inwardly, and the other markings outwardly with silvery white ; a marginal row of black white-bordered dots : hind wing pale greenish white. Head and thorax pale green. Thorax with a spot on each side in front and others on the top black. Abdomen pale grey, with delicate black dorsal spots.

Expanse $1\frac{1}{3}$ inch.

Bengal. In Coll. A. E. Russell.

D. DISCIBRUNNEA, n. sp. (Pl. VI. fig. 14.)

Pale dull green : fore wing with numerous spots along the costa, spots within and beneath the cell, base of wing, and transverse discal marks black ; those at the base, at the extremity of the cell, and the transverse discal series interspersed with brown ; a marginal series of small blackish lunules : hind wing pale greyish brown, with broad darker brown marginal and narrow discal bands. Head and thorax green, fringed with small blackish-brown spots. Abdomen greyish brown.

Expanse $1\frac{3}{8}$ inch.

Bengal. In Coll. A. E. Russell.

Genus *ACRONYCTA*, Ochs.

ACRONYCTA PRUINOSA, Guen. Noct. i. p. 53.

Silhet.

A. FLAVALA, n. sp.

Male. Fore wing greyish cupreous brown, with some short blackish streaks at the base, a black oblique transverse subbasal, discal, and submarginal sinuous grey-bordered lines, each terminating on the costa ; reniform mark small, grey, the space above it being also grey : hind wing yellow, with a broad submarginal pale brown band, which extends upwards along the abdominal margin to the base. Cilia of fore wing brown, of hind wing whitish. Head and thorax greyish white, speckled with black. Abdomen pale brown ; dorsal

tufts and tip darker. Underside glossy yellow: fore wing with a broad brown marginal band and large discal spot: hind wing with brown submarginal band.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

A. INDICA, n. sp.

Male. Dusky black: fore wing with a basal, double subbasal, a small circular white-centred orbicular mark, and a large quadrate reniform mark, three transverse discal lunulated lines, and a marginal row of spots black, more or less bordered with white: hind wing pale greyish brown. Palpi, head, and thorax hoary. Abdomen brown.

Expanse $1\frac{5}{8}$ inch.

Bengal. In Coll. F. Moore.

Genus GAURENA, Walk.

GAURENA FLORENS, Walk. Cat. Lep. Het. B. M. xxxii. Suppl. ii. p. 620.

Darjeeling.

G. FLORESCENS, Walk. ib. p. 620.

Darjeeling.

Fam. LEUCANIDÆ.

Genus MYTHIMNA, Hübn.

MYTHIMNA CERVINA, n. sp. (Pl. VI. fig. 18.)

Greyish fawn-colour: fore wing with ill-defined basal marks, a transverse recurved double line one-fourth from the base and a straighter similar double line one-fourth from the apex, and a submarginal series of small lunular spots chocolate-brown; the upper portion of the interspace between the transverse double lines also chocolate-brown, which contains two reversely oblique reniform marks, the inner one being greyish fawn-colour in the centre, the other dusky: hind wing and abdomen pale greyish brown. Head and thorax greyish fawn-colour, with chocolate-brown streaks. Cilia and tip of abdomen pinkish brown.

Expanse $1\frac{3}{4}$ inch.

Bengal. In Coll. A. E. Russell.

Genus LEUCANIA, Ochs.

LEUCANIA EXTRANEA, Guen. Noct. i. p. 77.

Calcutta.

L. EXSANGUIS, Guen. Noct. i. p. 83.

Silhet.

L. CONFUSA, Walk. Cat. Lep. Het. B. M. ix. Noct. p. 105.

L. EXTERIOR, Walk. ib. p. 106.

L. DESIGNATA, Walk. ib. p. 107.

L. VENALBA, n. sp.

Pale brownish ochreous: fore wing with the veins white, their interspaces with parallel narrow pale fawn-coloured lines; a pale diffused fawn-coloured streak from the base to the apex, which is divided at the apex by a pale oblique streak; a similar streak along the posterior margin; two dark dots below the cell, and an indistinct transverse discal series of dots: hind wing white. Head and thorax brownish ochreous, with hoary bands. Abdomen paler.

Expanse $1\frac{1}{4}$ inch.

Bengal. In Coll. A. E. Russell.

L. PULCHERRIMA, n. sp. (Pl. VI. fig. 7.)

Pale greyish fawn-colour: fore wing with the costa pale purplish fawn-colour; a greenish-brown fascia from the base of the costa to middle of the disk and thence ascending to the apex; a purplish-white streak bordering the outer margin of the fascia, from the discal angle of which it extends, in one direction, in a straight line with an ascending branch to the exterior margin of the wing, and in the other direction to the middle of the posterior margin, the ascending branch of the former being bordered above with greenish brown; a well-defined silvery-white longitudinal streak within the cell, beyond which is a white-speckled black reniform mark: hind wing pale greyish fawn-colour. Head, thorax, and abdomen greyish fawn-colour.

Expanse, ♂ $1\frac{1}{3}$, ♀ $1\frac{1}{4}$ inch.

Darjeeling. In Coll. A. E. Russell.

L. DECISSIMA, Walk. Cat. Lep. Het. B. M. xxxii. Suppl. ii. p. 624.

Darjeeling.

TYMPANISTES, n. g., Moore.

Body robust. Abdomen cylindrical, extending beyond the hind wings. Proboscis moderate. Antennæ stout, setaceous, long, extending beyond the middle of the costa. Legs slender; femora slightly pilose beneath; hind tibiæ with four moderately long spurs. Abdomen with a horny-like cavity at the base beneath, and a fan-like appendage above it on each side. Palpi erect, slender, long, extending above the head, slightly pilose; third joint long, cylindrical, two-thirds the length of the second. Fore wing long; costa moderately arched at the base, thence straight to the apex, which is slightly acuminate; exterior margin oblique, angle rounded; posterior margin convex near the base. Hind wings somewhat quadrate; anterior margin straight; exterior margin produced and rounded in the middle.

TYMPANISTES PALLIDA, n. sp. (Pl. VI. fig. 1.)

Male and *female* semitransparent, glossy: fore wing pale dull yellow, with three or four transverse indistinct dusky lunulated lines and a discal dot, and a marginal row of brown dots: hind wing pale white, with a more or less visible row of marginal dots. Head and thorax dull greenish. Antennæ testaceous. Abdomen and legs pale testaceous above, white beneath. Underside pale silky white.

Expanse $1\frac{3}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson, Esq.; F. Moore.

Note.—"This species makes a clicking noise as it flies. It has a drum-apparatus underneath."—*W. S. Atkinson*, Darjeeling, Aug. 1862.

T. TESTACEA, n. sp. (Pl. VI. fig. 2.)

Male and *female* testaceous, paler beneath: fore wing varied with suffused patches of green and pinkish testaceous, and with numerous delicate short transverse striæ; two irregular transverse indistinct dusky streaks, between which is a black discal spot; a submarginal zigzag dusky line, and a marginal row of black dots: hind wing and abdomen pinkish testaceous; cilia pinkish white. Head green. Thorax greenish testaceous.

Expanse $1\frac{1}{2}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Genus AUCHMIS, Hübn.

AUCHMIS SIKKIMENSIS, n. sp. (Pl. VI. fig. 15.)

Brownish fawn-colour: fore wing purplish along the costa, silvery grey beneath the costa; a black line from middle of the base interruptedly ascending to, and bordering the lower half of, a reniform stigma, and thence ascending in broken dashes to beneath the apex, the space beneath which from the base is dark greenish brown; obliquely on the exterior margin are three or four ascendingly decreasing dark-bordered silvery-grey lanceolate marks; a blackish streak along middle of posterior margin; a transverse series of indistinct black discal spots: hind wing pale, with broad brown marginal border. Thorax purplish fawn-colour, with brown-bordered black stripes. Abdomen greyish brown.

Expanse $1\frac{2}{3}$ inch.

Darjeeling. In Coll. A. E. Russell.

Remark.—Closely allied to *A. perspicillaris* of Europe.

Genus HERMONASSA, Walk.

HERMONASSA CONSIGNATA, Walk. Cat. Lep. Het. B. M. xxxii. Suppl. ii. p. 632.

Darjeeling (*W. S. Atkinson*).

PROC. ZOOL. SOC.—1867, No. IV.

Fam. GLOTTULIDÆ.

Genus POLYTELA, Guen.

POLYTELA GLORIOSÆ, Fabr. (Guen. Noct. i. p. 113).

Larva feeds on grass (July 19th); the same evening it went into the earth; ten days after the moth appeared.—*Lady Rose Gilbert's Notes.*

Genus GLOTTULA, Guen.

GLOTTULA DOMINICA, Cram. Pap. Exot. iv. pl. 399. f. H.

Larva feeds on *Crinum paneratum*, *Zephyranthus*, &c.—*E. Blyth.*

Genus CHASMINA, Walk.

CHASMINA CYGNUS, Walk. Cat. Lep. Het. B. M. ix. Noct. p. 147.

Fam. GORTYNIDÆ.

Genus GORTYNA, Ochs.

GORTYNA CUPREA, n. sp. (Pl. VI. fig. 8.)

Male dark ferruginous: fore wing with orbicular and reniform marks large, distinct, yellowish; exterior to each is a transverse blackish ashy-bordered line, which colour extends along the costa; some yellowish marks near the base; a submarginal lunulated yellowish line: hind wing blackish cupreous, paler along anterior margin; cilia pale cupreous. Head and thorax ferruginous. Abdomen ashy above, tuft and beneath ferruginous.

Expanse $1\frac{3}{8}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

Genus HYDRÆCIA, Guen.

HYDRÆCIA NAXIAOÏDES, n. sp.

Dark greenish brown: fore wing with two outwardly oblique darker brown chalybeous-outer-bordered transverse lines, the inner line straight and one-third from the base, the outer line waved and one-third from the apex; a submarginal row of irregularly disposed brown spots bordered outwardly by a chalybeous line: hind wing and abdomen plain brown. Head and thorax dark greenish brown. Cilia pale pinkish brown.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

Fam. XYLOPHASIDÆ.

Genus XYLOPHASIA, Steph.

XYLOPHASIA FLAVISTIGMA, n. sp.

Male ferruginous: fore wing suffused with blackish brown along the costa, across the basal half of the wing and in irregular longi-

tudinal streaks on the exterior margin, the latter with pale borders; a pale space below the apical half of the costa containing two round yellowish spots, one at the extremity of the cell, the other beyond; small spots along the costa, two marks within the cell, short streaks and transverse lines below the cell black: hind wing pale greyish brown, with broad darker brown marginal band. Head and thorax blackish brown, the latter ferruginous in the middle. Abdomen brown.

Expanse $1\frac{3}{4}$ inch.

Bengal. In Coll. A. E. Russell.

X. LEUCOSTIGMA, n. sp.

Female ferruginous: fore wing varied with pale ferruginous and dark ferruginous brown; a dark basal curved double line enclosing a pale space, a transverse sinuous double line beyond, irregular transverse discal lunulated lines, and submarginal row of lanceolate marks; orbicular mark pale; a large irregular-shaped pale-bordered white reniform mark: hind wing and abdomen reddish fawn-colour. Head and thorax varied pale ferruginous and dark ferruginous brown. Cilia ferruginous.

Expanse 2 inches.

Bengal. In Coll. A. E. Russell.

Genus DIPTERYGIA, Steph.

DIPTERYGIA INDICA, n. sp.

Female dark reddish brown: fore wing mottled with blackish brown, a greyish elongated patch disposed exteriorly along posterior margin, bordered above by an irregular blackish line: hind wing and abdomen brown. Head and thorax dark reddish brown.

Expanse $1\frac{1}{2}$ inch.

Darjeeling. In Coll. F. Moore.

Genus SPODOPTERA, Guen.

SPODOPTERA CILIUM, Guen. Noct. i. p. 156.

Larva feeds on the Doobh Grass (*Cynodon dactylon*).—*A. Grote, Esq.*

Genus PRODENIA, Guen.

PRODENIA CILIGERA, Guen. Noct. i. p. 163.

P. glaucistriga, Walk. Cat. Lep. Het. B. M. ix. Noct. 197, ♀.

? *P. retina*, Boisd.

Larva very destructive to cabbages.—*A. Grote, Esq.*

P. infecta, Walk. ib. p. 196.

P. insignata, Walk. ib. p. 197.

P. lectula, Walk. ib. xv. Noct. p. 1679.

Genus CALOGRAMMA, Guen.

CALOGRAMMA FESTIVA, Donov. Epit. Ins. New Holl.

C. picta, Guen. Noct. i. p. 166 (Voy. Coquille, ii. pl. 19. f. 7).Larva feeds on *Crinum* and Liliaceous plants.—*A. Grote, Esq.*

Fam. EPISEMIDÆ.

Genus HELIOPHOBUS, Boisd.

HELIOPHOBUS DISSECTUS, Walk. Cat. Lep. Het. B. M. xxxii. Suppl. ii. p. 656.

Fam. APAMIDÆ.

Genus MAMESTRA, Ochs.

MAMESTRA INFAUSTA, Walk. Cat. Lep. Het. B. M. ix. Noct. p. 237.

Silhet.

M. chalybeata, Walk. ib. xxxii. Suppl. ii. p. 665.Darjeeling (*W. S. Atkinson*).*M. metallica*, Walk. ib. p. 666.Darjeeling (*W. S. Atkinson*).*M. nigrocuprea*, n. sp.*Male* glossy blackish cupreous: fore wing with indistinct black transverse subbasal, discal, and submarginal lunulated lines; orbicular and reniform marks black, the latter partly pale-centred: hind wing pale cupreous brown, darkest exteriorly. Abdomen brown.Expanse $1\frac{1}{4}$ inch.

Bengal. In Coll. A. E. Russell; F. Moore.

M. suffusa, n. sp.*Male* and *female* dark glossy fawn-coloured brown, suffused with chalybeous: fore wing with two transverse subbasal blackish sinuous lines; orbicular marks within the cell and three discal lunulated lines, a submarginal pale outer-bordered dark wavy line, and a marginal row of blackish points bordered within with chalybeous speckles. Reniform mark white in the male, pale brown in the female. Head and thorax dark brown. Hind wing and abdomen pale fawn-coloured brown; anal tuft pale ferruginous brown. Cilia greyish brown.Expanse, ♂ $1\frac{3}{4}$, ♀ 2 inches.

Bengal. In Coll. A. E. Russell; F. Moore.

M. albomaculata, n. sp.*Male* and *female* dark fawn-coloured brown: fore wing with several indistinct blackish transverse lunulated lines more or less bordered with whitish speckles; a series of small spots along the costa, large irregular-shaped reniform mark, a marginal row of dots,

and distinct spots on cilia white : hind wing and abdomen pale brown. Head and thorax dark brown ; a large white spot at the base of the thorax. Cilia brown, edged with white.

Expanse, ♂ $1\frac{2}{10}$, ♀ $1\frac{4}{10}$ inch.

Darjeeling. In Coll. A. E. Russell ; W. S. Atkinson.

M. ALBIRENA, n. sp.

Male dark greyish brown : fore wing with small spots on the costa, a few disposed near the base ; a discal row of dots, a submarginal and marginal wavy line, pale greyish brown ; reniform mark composed of a short white upright streak and a separate lower spot, which is constricted on its inner side : hind wing brown, with a paler marginal wavy line. Exterior margins of the wings scalloped ; the apex of fore wing slightly falcated. Head, thorax, and abdomen greyish brown.

Expanse $1\frac{5}{8}$ inch.

Calcutta ; Darjeeling. In Coll. A. E. Russell ; W. S. Atkinson.

M. SIKKIMA, n. sp.

Male and *female* dark fuliginous brown : fore wing with a short subbasal longitudinal streak, beyond which is a transverse sinuous double line, the discal lunulated lines, and a submarginal row of short longitudinal streaks black, more or less with greenish-grey borders ; orbicular and reniform marks large and greenish grey : hind wing pale fuliginous brown, darkest exteriorly. Head and thorax blackish ; thorax with a slight ferruginous collar fringed with white. Abdomen brown.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. A. E. Russell ; F. Moore.

Genus PERIGEA, Guen.

PERIGEA TRICYCLA, Guen. Noct. i. p. 226.

Silhet.

P. APAMEOÏDES, Guen. Noct. i. p. 229.

♂. *P. canorufa*, Walk. Catal. Lep. Het. B. M. xxxii. Suppl. ii. p. 683.

♀. *P. illecta*, Walk. ib. p. 684.

Larva feeds on *Cereopsis*.—*A. Grote, Esq., Calcutta.*

Genus AMYNA, Guen.

AMYNA SELENAMPHA, Guen. Noct. i. p. 406 ; Walk. Cat. Lep. Het. B. M. xv. p. 1696.

A. spoliata, Walk. ib. xiii. p. 1050.

Silhet.

Fam. NOCTUIDÆ.

Genus AGROTIS, Ochs.

AGROTIS SUFFUSA, Gmel. (Guen. Noct. i. p. 268).

Genus *EPILECTA*, Hübn.*EPILECTA PULCHERRIMA*, n. sp. (Pl. VI. fig. 3.)

Male and *female* blackish cupreous brown: fore wing with two basal, one discal, and two marginal black-bordered yellowish-green transverse lunulated lines, the discal row with the lower lunules exteriorly pointed with white; reniform spot yellow; four small whitish spots on costa before the apex: hind wing cupreous brown, with a broad irregular golden-yellow discal band. Cilia of hind wing broad, brown in the middle of the margin, the rest yellow. Head, thorax, and anal tuft blackish brown. Abdomen brown, the segments with narrow pale yellowish band.

Expanse $1\frac{7}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Genus *TRIPHÆNA*, Ochs.*TRIPHÆNA SEMIHERBIDA*, Walk. Cat. Lep. Het. B. M. xi. Noct. p. 743.Genus *GRAPHIPHORA*, Ochs.*GRAPHIPHORA C-NIGRUM*, Linn. (Guen. Noct. i. p. 328).*G. CERASTIOIDES*, n. sp.

Male and *female* dark purple fawn-colour: fore wing with two darker transverse subbasal indistinct double lines, orbicular mark, and a transverse discal double line, the latter with an outward row of indistinct dots and a submarginal pale line; reniform mark distinct and reddish-centred: hind wing and abdomen pale fawn-colour; tip of abdomen and cilia pale reddish. Head and thorax dark purple fawn-colour.

Expanse $1\frac{1}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson; Brit. Mus.

G. FASCIATA, n. sp.

Male and *female* pale testaceous: fore wing with a dark fascia across the middle and along the exterior margin; an ill-defined blackish basal, subbasal, and discal transverse narrow lunulated lines, the last having an outer row of blackish dots, beyond which is a wavy pale-bordered line and a row of marginal dots; a blackish spot within the cell; reniform mark distinct, brighter testaceous above, blackish below, partly bordered with white: hind wing pale fawn-colour. Head, thorax, and abdomen pale testaceous.

Expanse $1\frac{3}{8}$ inch.

Darjeeling. In Coll. A. E. Russell; F. Moore.

G. BASISTRIGA, n. sp.

Male greyish testaceous: fore wing with a diffused dark longitudinal streak from the base, which spreads along the posterior margin; two subbasal dusky double lines, the second of which proceeds to near the posterior angle; orbicular and reniform marks, discal and

submarginal double lines, and costal spots dusky, between the latter is a double row of blackish dots; a single blackish dot near base of the cell: hind wing pale yellowish testaceous, with an indistinct discal streak. Head grey, thorax dark, and abdomen pale testaceous. Cilia pinkish testaceous.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson; Brit. Mus.

G. RUBICILIA, n. sp.

Male and *female* yellowish testaceous: fore wing with a slight dark fascia diffused across the middle, and a streak obliquely before the apex; reniform mark, a marginal row of narrow longitudinal dusky streaks transversely divided in the middle and bordered inwardly by a narrow pale line: hind wing pale pinkish fawn-colour. Head and front of thorax greenish yellow; hind part of thorax testaceous. Abdomen pale testaceous, tuft reddish. Cilia pale reddish.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

Genus OCHROPLEURA, Hübn.

OCHROPLEURA FLAMMATRA, Gmel. (Guen. Noct. i. p. 327).

Agrotis basiclavus, Walk. Cat. Lep. Het. B. M. x. Noct. p. 346.

O. RENALIS, n. sp.

Male brownish fawn-colour: fore wing with a transverse basal and subbasal double lines, between which is a diffused streak, a slight spot beneath the cell, the space before the orbicular and reniform marks blackish, both being greyish-centred and with their borders black; two transverse series of ill-defined dusky dots: hind wing and abdomen pale brown; anal tuft pale ferruginous. Head and thorax brown; thorax with a slight blackish collar.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

O. SPILOTA, n. sp.

Female dull testaceous: fore wing with the costa broadly testaceous yellow; the veins lined with yellowish; a longitudinal spot within the cell, a transverse lunule at the extremity, and a longitudinal spot beneath the cell, and two or three smaller basal spots jet-black, each with a pale yellow narrow border; exterior margin with a series of black dots: hind wing pale yellowish testaceous. Head, thorax, and abdomen testaceous.

Expanse $1\frac{2}{10}$ inch.

Bengal. In Coll. A. E. Russell; F. Moore.

O. TRIANGULARIS, n. sp.

Female dark chocolate-brown: fore wing with a broad basal costal streak, including the orbicular mark and the inner border of the reniform mark, yellowish ferruginous, which is bordered below by a

jet-black line extending at the base into a large triangular streak ; two transverse pale discal wavy lines ; a short black descending spot from the costa before the apex terminated by a pale submarginal line : hind wing and abdomen pale chocolate-brown. Head and thorax chocolate-brown ; front of thorax yellowish ferruginous, bordered by a broad jet-black collar.

Allied to *O. musiva*.

Expanse $1\frac{5}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson ; F. Moore.

O. COSTALIS, n. sp.

Pale pinkish testaceous : fore wing with a broad testaceous-white costal streak bordered below by a parallel black streak interrupted by well-defined small pale-centred orbicular and reniform marks ; exterior margin with a row of black dots : hind wing white. Head and front of thorax pale pinkish testaceous, divided by a black line, two small black spots between the base of the antennæ ; hind part of thorax dark pinkish testaceous. Abdomen pale testaceous.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson ; Brit. Mus.

FAM. ORTHOSIDÆ.

Genus ORTHOSIA, Ochs.

ORTHOSIA CURVIPLANA, Walk. Catal. Lep. Het. B. M. xxxiii. Suppl. iii. p. 715.

Darjeeling (*W. S. Atkinson*).

O. EXTERNA, Walk. ib. p. 715.

Darjeeling (*W. S. Atkinson*).

Genus DABARITA, Walk.

DABARITA SUBTILIS, Walk. ib. x. Noct. p. 479.

Larva feeds on the Jambon tree (*Eugenia jambolana*).—*A. Grote, Esq.*

FAM. HADENIDÆ.

Genus AGRIOPIS, Boisd.

AGRIOPIS LEPIDA, n. sp.

Male greyish white : fore wing with a subbasal and subapical ferruginous-brown patch, both irregularly bordered by a black line, the latter having inner blackish parallel lines crossing the disk ; a black dot between the patches ; exterior margin ferruginous brown, with a blackish dotted wavy marginal line, the dots being white exteriorly : hind wing white, with a pale brown exterior border. Cilia of both wings alternate pale brown and white.

Expanse $1\frac{5}{8}$ inch.

Bengal. In Coll. A. E. Russell.

A. DISCALIS, n. sp. (Pl. VII. fig. 2.)

Male and *female* greyish white: fore wing with basal, medial, and discal transverse pale brown lunulated lines, the medial and discal lines suffused with darker brown at their costal end, and joined by a black longitudinal irregular discal streak, forming a curved subapical streak; some blackish marks on the costa near the base, the furthest forming an interrupted transverse line: hind wing paler white, with broad pale brown exterior band; cilia alternate pale brown and white. Abdomen pale brown at the apex.

Expanse 2 inches.

Bengal. In Coll. A. E. Russell; F. Moore.

Genus PHLOGOPHORA, Ochs.

PHLOGOPHORA INDICA, n. sp.

Female pinkish fawn-colour: fore wing with a dark brown medial oblique band, above which the discal marks join at their base, with a blackish upper space between them; two subbasal minute spots, between which are two short transverse lines; a diffused streak ascending from near the base of posterior margin, two transverse discal lunulated lines brown, the outer line being medially bordered by dark brown, beyond which the margin is ashy: hind wing paler, with diffused dark marginal lines. Head, thorax, and abdomen pinkish fawn-colour.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

Genus EUPLEXIA, Steph.

EUPLEXIA ALBOVITTATA, n. sp. (Pl. VI. fig. 16.)

Male and *female* dark fuliginous black; exterior margin scalloped: fore wing with an irregular-margined partly transverse subbasal band, and a broad transverse discal band silky white, both with an anterior brownish mark, and the outer band speckled with brown; outer margin of orbicular and inner margin of reniform mark bordered with white; a row of brownish marginal lunules, the extreme scalloped margin being black: hind wing fuliginous; a streak and the cilia at anal angle and two small quadrate spots above white; cilia alternate brown and white. Head and thorax dark fuliginous black, speckled with white. Base of abdomen white, lower part fuliginous.

Expanse $1\frac{1}{2}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

E. DISCISIGNATA, n. sp. (Pl. VI. fig. 9.)

Male and *female*. Fore wing pale yellowish green, the base and lower part of the disk varied with ferruginous brown and blackish speckles; an ashy-brown patch crossing the middle from the costa to below the cell, on the inside of which is an elongated oblique black pale-bordered spot, and on the outside is a similar but more irregular-

shaped spot, both being jet-black, the latter bordering the two inner sides of a white brown-speckled reniform mark; the disk transversely varied with brown streaks, the exterior margin being broadly ashy brown: hind wing pale brown, with a narrow marginal ferruginous line; two or three short white streaks ascending from near anal angle. Head and thorax ashy brown. Abdomen pale brown; tuft darker. Cilia dark brown.

Expanse, ♂ $1\frac{1}{3}$, ♀ $1\frac{2}{3}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

E. STRIATOVIRENS, n. sp.

Male and *female* ferruginous brown: fore wing with a transverse basal sinuous line, two transverse discal lines, the posterior margin between the latter, and a submarginal streak from before the apex pale green, the space before the orbicular and reniform marks and beneath the last dusky brown; reniform mark chequered with white and green lines; exterior margin dusky brown: hind wing pale brown; two short white marginal streaks from anal angle. Head and thorax ashy brown. Abdomen pale brown.

Expanse, ♂ $1\frac{1}{3}$, ♀ $1\frac{2}{3}$ inch.

Darjeeling. In Coll. W. S. Atkinson; Brit. Mus.

Genus EUROIS, Hübn.

EUROIS AURIPLENA, Walk. Cat. Lep. Het. B. M. xi. Noct. p. 557.

E. CRASSIPENNIS, Walk. ib. p. 558.

Silhet.

Genus HADENA, Treit.

HADENA MEGASTIGMA, Walk. ib. xxxiii. Suppl. iii. p. 738.

Darjeeling.

II. ALBINOTA, n. sp.

Male greenish brown: fore wing with some marks at the base, along the costa, two transverse indistinct medial lunulated lines, and a zigzag submarginal line; a patch composed of the orbicular and reniform marks and a lower space, costal and exterior margins, pale green; a short pearly-white spot beneath the orbicular mark; a small ferruginous patch near the posterior angle: hind wing cupreous brown. Head and thorax greenish brown. Abdomen brown, with pale ferruginous tuft.

Expanse $1\frac{3}{4}$ inch.

Bengal. In Coll. A. E. Russell; F. Moore.

II. ATROVIRENS, n. sp.

Male and *female*. Fore wing dark green, with a blackish patch at the base of posterior margin, and another across the disk; some basal and discal marks, two medial transverse lines of lunules, submarginal diffused streaks, and zigzag marginal line black; the sub-

marginal streaks bordered within by ferruginous; orbicular and reniform marks large and green-centred: hind wing fuliginous brown, with a marginal and discal pale line. Head and thorax dark green, varied with brown. Abdomen brown; tuft in the male pale ferruginous.

Expanse, ♂ $1\frac{3}{5}$, ♀ $1\frac{1}{2}$.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

H. AUROVIRIDIS, n. sp. (Pl. VI. fig. 11.)

Male golden green: fore wing with a row of white spots with black borders along the costa; basal zigzag transverse line, two lines beneath the cell, orbicular mark, two zigzag discal lines, and a marginal wavy line white, the interspace of the basal line, lower discal, orbicular and reniform marks, and the outer submarginal line dark brown: hind wing pale cupreous brown, with whitish marginal line. Head and thorax brownish green. Abdomen brown.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell; F. Moore.

H. TENEBROSA, n. sp.

Male blackish brown: fore wing marked with numerous irregular longitudinal narrow black streaks; a small orbicular mark and an elongated apical patch dull ferruginous brown: hind wing blackish cupreous brown; cilia greyish brown. Head and thorax ferruginous brown, with numerous blackish-brown scales. Abdomen blackish brown; tuft ferruginous.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

H. ALBIDISCA, n. sp. (Pl. VI. fig. 17.)

Male. Fore wing pale ferruginous, suffused with greenish posteriorly; a white zigzag transverse basal and lunulated subbasal and discal lines; a zigzag marginal and a wavy marginal line white; the basal alternately patched, the subbasal exteriorly and the discal interiorly, the submarginal and marginal exteriorly bordered with black; middle of the disk suffused with blackish brown; orbicular mark black, bordered exteriorly with white; a large reniform mark and streak beneath it white: hind wing pale cupreous brown, with an indistinct spot and discal band; cilia pale ferruginous. Head and thorax ferruginous. Abdomen paler.

Expanse $1\frac{1}{8}$ inch.

Bengal. In Coll. F. Moore.

H. LANCEOLA, n. sp.

Female dull brownish green: fore wing with two subbasal transverse zigzag black double lines joined in the middle by a short streak, the outer line having a longitudinal pointed black-centred mark, forming a spear-head; orbicular and reniform marks black-centred; a transverse discal double row and a submarginal line of dusky lu-

nules: hind wing pale brown. Head and thorax dull greenish brown. Abdomen brown.

Expanse $1\frac{1}{3}$ inch.

Bengal. In Coll. F. Moore.

Genus CHECUPA, n. g., Moore.

Palpi stout, short, erect, covered with short adpressed hairs; third joint minute, conical. Antennæ minutely serrated. Proboscis short. Legs robust, densely clothed with short hairs; hind tibia with four elongated appendages. Body very robust; thorax thick, broad, densely pilose beneath. Abdomen elongated, flat, extending one-third beyond the hind wing, tufted; fourth, fifth, and sixth segments produced laterally, the fifth being prolonged into a hollow upright horn-like projection. Fore wing long; costa nearly straight; exterior and posterior margins rounded; no trace of angle. Hind wings trigonate; apex produced, rounded; abdominal angle lobed.

CHECUPA FORTISSIMA, n. sp. (Pl. VI. fig. 5.)

Male and female greenish black, brown beneath: fore wing with the base, large orbicular and reniform marks, a streak beneath, posterior and exterior margins golden green, slightly marked with short blackish transverse streaks; a submarginal and marginal row of longitudinal black streaks divided by a line of white lunules: hind wing cupreous brown. Head and thorax golden green. Abdomen brown, tipped with greenish. Legs green; tarsi brown.

Expanse $2\frac{2}{10}$ inches.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Genus SARBANISSA, Walk.

SARBANISSA INSOCIA, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 746.

Darjeeling (*W. S. Atkinson's Coll.*).

Fam. XYLINIDÆ.

Genus CUCULLIA, Ochs.

CUCULLIA TENUIS, n. sp.

Male blackish cupreous brown: fore wing elongated, very narrow, wrinkled apically; a small black spot near the base: hind wing pale cupreous brown. Palpi black. Head and thorax blackish cupreous, and abdomen pale cupreous brown.

Expanse $1\frac{1}{2}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Fam. HELIOTHIDÆ.

Genus HELIOTHIS, Guen.

HELIOTHIS ARMIGERA, Hübn. (Guen. Noct. ii. p. 181).

H. PELTIGERA, Treit. (Guen. Noct. ii. p. 180).

Fam. ACONTIDÆ.

Genus XANTHODES, Guen.

XANTHODES TRANSVERSA, Guen. Noct. ii. p. 211.

X. INTERSEPTA, Guen. ib. p. 212.

X. IMPELLENS, Walk. Cat. Lep. Het. B. M. xv. Noct. p. 1752.

X. INNOCENS, Walk. ib. p. 1752.

X. IMPARATA.

Xanthia imparata, Walk. ib. x. Noct. p. 467.

Genus CANNA, Walk.

CANNA PULCHRIPICTA, Walk. ib. xxxiii. Suppl. iii. p. 790, pl. 6. f. 10.

Darjeeling.

Genus ACONTIA, Ochs.

ACONTIA OLIVEA, Guen. Noct. ii. p. 217.

Bengal.

Larva feeds on the Brinjal (*Solanum melongena*).—*A. Grote, Esq.*

A. TROPICA, Guen. ib. p. 217.

A. SIGNIFERA, Walk. Cat. Lep. Het. B. M. xii. p. 793.

Calcutta (*W. S. Atkinson*).

Fam. ERASTRIDÆ.

Genus ERASTRIA, Ochs.

ERASTRIA ? VENULIA, Cram. Pap. Exot. ii. pl. 165. f. D.

Fam. ANTHOPHILIDÆ.

Genus ANTHOPHILA, Ochs.

ANTHOPHILA HÆMORRHOIDA.

Micra hemirhoda, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 799.

Anthophila roseifascia, Walk. ib. p. 803.

Fam. ERIOPIDÆ.

Genus CALLOPISTRIA, Hübn.

CALLOPISTRIA EXOTICA.

Eriopus exotica, Guen. Noct. ii. p. 294.

Darjeeling (*W. S. Atkinson*).

Fam. EURHIPIDÆ.

Genus ANUGA, Guen.

Syn. *Piada*, Walk.

ANUGA CONSTRICTA, Guen. Noct. ii. p. 308.

A. LUNULATA, n. sp.

Female greyish brown: fore wing with the costal half pale, the hinder half dark greyish brown, marked with numerous transverse darker brown lunules: hind wing dark greyish brown, whitish at the base; a ferruginous dark-bordered streak and contiguous spots from the anal angle. Body greyish brown.

Expanse $1\frac{3}{8}$ inch.

Bengal. In Coll. A. E. Russell.

Genus EUTELIA.

EUTELIA, sp?

Genus VARNIA, Walk.

VARNIA IGNITA, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii.
p. 825.

Silhet.

V. INÆQUALIS, Walk. ib. p. 828.

Silhet.

Fam. PLUSIDÆ.

Genus ABROSTOLA, Ochs.

ABROSTOLA SUBAPICALIS, Walk. ib. xii. Noct. p. 883.

Ingura recurrens, Walk. ib. xv. p. 1779.

Calcutta.

Genus PLUSIA, Ochs.

PLUSIA AURIFERA, Hübn. (Guen. Noct. ii. p. 335).

Larva found on common cabbage.

P. VERTICILLATA, Walk. Cat. Lep. Het. B. M. xii. Noct. p. 923.

Calcutta.

Larva found on geranium.—*A. Grote, Esq.*

P. AGRAMMA, Guen. Noct. ii. p. 327.

P. inchoata, Walk. Cat. Lep. Het. B. M. Suppl. iii. p. 841.

Larva feeds on the Kudadoo (*Lagenoica vulgaris*), apparently on the leaf-tendrils.—*A. Grote, Esq.*

P. SIGNATA, Fabr. (Guen. Noct. iii. p. 345).

P. FURCIFERA, Walk. Cat. Lep. Het. B. M. xii. p. 927.

P. ORNATISSIMA, Walk. ib. xv. p. 1786.

P. GEMMIFERA, Walk. Cat. Lep. Het. B. M. xii. p. 934.

P. SEMIVITTA, n. sp. (Pl. VI. fig. 13.)

Male and *female* greyish brown, paler beneath; fore wing slightly suffused with cupreous from middle of the costa and below the apex; an elongated slightly oblique longitudinal discal silvery mark, beneath which is an oblique square dark brown band bordered on each side by a pale line, the outer line extending upward to the costa before the apex: hind wing and abdomen pale cupreous brown. Head and thorax greyish brown, the latter with narrow brighter brown collar.

Expanse $1\frac{1}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Fam. CALPIDÆ.

Genus PLUSIODONTA, Guen.

Syn. *Deva*, Walk.

PLUSIODONTA CHALSYTOIDES, Guen. Noct. ii. p. 360.

Deva conducens, Walk. Cat. Lep. Het. B. M. xii. Noct. p. 963. Calcutta.

Larva bred on *Clypea* and *Cissampelos*.—A. Grote, Esq.

Genus ORÆSIA, Guen.

ORÆSIA PROVOCANS, Walk. ib. p. 943.

Silhet.

O. RECTISTRIA, Guen. Noct. ii. p. 363.

O. EMARGINATA, Fabr. (Guen. ib. p. 363).

Genus CALPE, Treit.

CALPE MINUTICORNIS, Guen. ib. p. 374.

Fam. HYBLÆIDÆ.

Genus HYBLÆA, Fabr.

HYBLÆA PUERA, Cram. Pap. Exot. ii. pl. 103. f. D, E.

Larva reared on *Bignonia* and on *Callicarpa*.—A. Grote, Esq.

H. CONSTELLATA, Guen. Noct. ii. p. 391.

H. FIRMAMENTUM, Guen. ib. p. 392.

Genus PHYCODES, Guen.

Syn. *Tegna*, Walk.

PHYCODES HIRUNDINICORNIS, Guen. ib. p. 389.

Tegna hyblæella, Walk. Catal. Lep. Het. B. M. xxxv. Suppl. v. p. 1810.

Larva abundant on banyan (*Ficus indica*).—A. Grote, Esq.

Fam. GONOPTERIDÆ.

Genus COSMOPHILA, Boisd.

COSMOPHILA XANTHINDYMA, Boisd. (Guen. Noct. ii. p. 396).

Cirradia variolosa, Walk. Cat. Lep. Het. B. M. xii. p. 750.

Larva feeds on *Hibiscus*.—A. Grote, *Esq.*

Genus ANOMIS, Hübn.

ANOMIS FULVIDA, Guen. Noct. ii. p. 397.

A. GUTTANIVIS.

Gonitis guttanivis, Walk. Cat. Lep. Het. B. M. xiii. p. 1003.

Genus OSSONOBA, Walk.

OSSONOBA TORPIDA, Walk. ib. xxxv. Suppl. v. p. 1966.

Remark.—The genus *Ossonoba* is closely allied to *Scoliopteryx*, Germ. (*Gonoptera*, Latr.).

Fam. AMPHIPYRIDÆ.

Genus AMPHIPYRA, Ochs.

AMPHIPYRA MONOLITHA, Guen. Noct. ii. p. 414.

Genus NÆNIA, Steph.

NÆNIA CUPREA, n. sp.

Male blackish cupreous brown, chalybeate-washed; fore wing with three or four short coppery-red costal bars with black borders; costal and discoidal vein coppery red; orbicular and reniform marks with a narrow yellowish border, the space before each and spot beneath black; one basal and two medial irregular transverse lunulated double black lines; a submarginal and a wavy marginal coppery line, the former bordered within by a row of broad black lunules; hind wing pale cupreous brown. Head and thorax blackish brown varied with ferruginous. Abdomen greyish brown, tips ferruginous. Cilia of hind wing pale ferruginous.

Expanse $2\frac{1}{8}$ inches.

Bengal. In Coll. A. E. Russell.

N. CHALYBEATA, n. sp.

Female blackish cupreous brown: fore wing with numerous chalybeate speckles; the discal veins lined with chalybeous; a basal and subbasal zigzag chalybeate line, a discal and submarginal lunulated chalybeate line, each with a dark border; exterior margin chalybeous; orbicular and reniform marks dark, centred with chalybeate speckles, reniform mark large and with a copper-coloured border; hind wing dull pale cupreous brown, with a narrow whitish marginal

band ; cilia brown, speckled with white. Head and thorax blackish brown. Abdomen brown.

Expanse $2\frac{2}{3}$ inches.

Bengal. In Coll. F. Moore.

Fam. TOXOCAMPIDÆ.

Genus TOXOCAMPA, Guen.

TOXOCAMPA TETRASPILA.

Remigia tetraspila, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii.
p. 1018.
Darjeeling.

T. COSTIMACULA, Guen. Noct. ii. p. 429.

Remigia triangulata, Walk. ib. p. 1017.
Silhet.

Fam. POLYDESMIDÆ.

Genus PANDESMIA, Guen.

Syn. *Cerbia*, Walk.

PANDESMIA QUÉNAVADI, Guen. Noct. ii. p. 438.
Silhet.

Genus POLYDESMIA, Boisd.

POLYDESMIA BOARMOIDES, Guen. Noct. ii. p. 441.

Alamis brevivalpis, Walk. Cat. Lep. Het. B. M. xiii. p. 1051.

P. SCRIPTILIS, Guen. Noct. ii. p. 442.
Silhet.

P. OTIOSA, Guen. ib. p. 442.
Silhet.

Fam. HOMOPTERIDÆ.

Genus ALAMIS, Guen.

ALAMIS ALBICINCTA, Guen. Noct. iii. p. 4.

A. OPTATURA.

Remigia optatura, Walk. Cat. Lep. Het. B. M. xv. p. 1848.

A. CONTINUA, Walk. ib. xxxiii. Suppl. iii. p. 877.

A. GLAUCINANS, Guen. Noct. iii. p. 6.

Genus HOMOPTERA, Boisd.

HOMOPTERA INFLIGENS, Walk. l. c. xiii. Noct. p. 1068.

Fam. HYPOGRAMMIDÆ.

Genus BRIADA, Walk.

BRIADA PRÆCEDENS, Walk. Cat. Lep. Het. B. M. xiii. p. 1098.

B. VARIANS, n. sp. (Pl. VI. fig. 12.)

Female blackish brown: fore wing with transverse basal, subbasal, and discal black-bordered yellow wavy narrow lines; reniform mark elongated, yellowish, with black centre; space beyond the discal line golden yellow, margined by a transverse pure-white narrow line, outside of which is a blackish pale-bordered transverse streak interrupted in the middle by a suffused streak proceeding to the middle of exterior margin: hind wing and abdomen greyish brown; cilia with pale inner line. Head and thorax ferruginous brown.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell; F. Moore.

B. CERVINA, Walk. ib. xxxv. Suppl. v. p. 1968.

Genus CALLYNA, Guen.

CALLYNA SIDEREA, Guen. Noct. i. p. 113.

Silhet.

C. MONOLEUCA, Walk. l. c. xv. p. 1667.

Darjeeling (*W. S. Atkinson*).

Fam. CATEPHIDÆ.

Genus COCYTODES, Guen.

COCYTODES CÆRULEA, Guen. Noct. iii. p. 41.

Silhet.

C. MODESTA, Van der Hoeven, Lép. Nouv. pl. 7. f. 8.

C. immodesta, Guen. Noct. iii. p. 42.

Genus CATEPHIA, Ochs.

CATEPHIA LINTEOLA, Guen. ib. p. 44.

Genus ERCHEIA, Walk.

ERCHEIA TENEBROSA, n. sp.

Male blackish brown: fore wing with an elongated curved ferruginous apical streak, which is margined and marked with black lines; reniform mark and a parallel line beyond dull ferruginous; posterior margin broadly ferruginous, with numerous dark speckles, the division of colour marked by a black irregular line; a black wavy line and some irregular streaks ascending from before the posterior angle: hind wing fuliginous black, with two white spots from above anal angle; cilia with two elongated white streaks. Underside whitish

testaceous: fore wing streaked with black on posterior margin; broad transverse discal and submarginal blackish bands: hind wing with discal spot, an irregular sinuous narrow medial and broad submarginal band; exterior border of both wings with short longitudinal blackish streaks and marginal row of dots; cilia as above.

Expanse $2\frac{1}{2}$ inches.

Bengal. In Coll. A. E. Russell.

Remark.—This insect is very much like *Achæa subsignata*, from Sierra Leone.

Genus ANOPHIA, Guen.

ANOPHIA ACRONYCTOIDES, Guen. Noct. iii. p. 47.

Genus ERYGIA, Guen.

Syn. *Calicula*, Walk.

ERYGIA APICALIS, Guen. Noct. iii. p. 50.

Calicula exempta, Walk. Cat. Lep. Het. B. M. xv. p. 1808.

Genus ODONTODES, Guen.

ODONTODES BOLINOIDES.

Briada bolinoides, Walk. ib. Noct. p. 1802.

Steiria subfasciata, Walk. ib. Suppl. iii. p. 922.

S. quadristriata, Walk. ib. p. 923.

—? *inordinata*, MS. B. M. Cabinet.

Genus STICTOPTERA, Guen.

STICTOPTERA ILLUCIDA, Walk. l. c. p. 918.

Calcutta (*W. S. Atkinson*).

S. GRISEA, n. sp.

Male greyish brown: fore wing speckled with grey at the base, medially, and along exterior margin; orbicular and reniform marks black; a black spot below and a transverse wavy line beyond the former, and a similar line beyond the latter, exterior to which is a submarginal recurved interrupted series of grey inner-bordered black lunules, and a marginal row of blacker lunulated spots: hind wing diaphanous, purplish grey, with a broad marginal brown band. Head and collar on thorax ferruginous brown; thorax greyish brown. Abdomen brown.

Expanse $1\frac{5}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson.

Fam. HYPOCALIDÆ.

Genus HYPOCALA, Guen.

HYPOCALA DEFLORATA, Fabr. (Guen. Noct. iii. p. 76).

H. EFFLORESCENS, Guen. Noct. iii. p. 77.

H. ROSTRATA, Fabr. (Guen. ib. p. 74).

H. SUBSATURA, Guen. ib. p. 75.

Fam. CATOCALIDÆ.

Genus CATOCALA, Ochs.

CATOCALA NEPCHA, n. sp.

Fore wing ferruginous brown; basal half with irregular-shaped black marks; a square white spot closing the cell, adjoining which is a narrow transverse white band bordered within with black; a sub-marginal series of triangular black spots; and a marginal series of black lunules with grey inner borders; cilia greyish brown; hind wing ochreous yellow, with broad black marginal band; cilia greyish brown, spotted with greyish white. Underside—fore wing yellow at the base; the rest black, with a broad medial large white patch and a smaller one beneath it at the posterior angle: hind wing as above, but with a broad white medial patch having a black inner streak from anterior margin. Antennæ yellow. Head black. Thorax ferruginous brown. Abdomen yellow, with dorsal and lateral row of blackish-brown spots.

Expanse $2\frac{3}{4}$ inches.

Darjeeling. In Coll. A. Grote, Esq.

C. DOTATA, Walk. Cat. Lep. Het. B. M. xiii. p. 1212.

Fam. OPHIDERIDÆ.

Genus OPHIDERES, Boisd.

OPHIDERES MATERNA, Linn. (Cram. Pap. Exot. ii. pl. 174. f. B, pl. 267. f. E).

O. FULLONICA, Linn. (Guen. Noct. iii. p. 111).

Noctua dioscoreæ, Fab. Sp. Ins. ii. p. 212.

Phalæna-Noctua pomona, Cram. pl. 77. f. C.

O. CAJETA, Cram. Pap. Exot. i. pl. 3. f. A-C.

O. SALAMINIA, Cram. ib. ii. pl. 174. f. A.

O. HYPERMNESTRA, Cram. ib. iv. pl. 323. f. A, B.

O. PLANA, Walk. Cat. Lep. Het. B. M. xiii. p. 1226.

Fam. PHYLLODIDÆ.

Genus PHYLLODES, Boisd.

PHYLLODES CONSOBRINA, Westw. Cab. Orient. Ent. pl. 28. f. 2.

P. USTULATA, Westw. ib. pl. 28. f. 1.

P. FASCIATA, n. sp.

Male greenish brown: fore wing with a dark brown line from the apex to beneath an irregular elongated transverse discal pale mark; a short basal, two discal, and a third subapical transverse glossy-purple diffused bands, the discal band bordering the lower margin of the apical line and being confluent on the hind margin of the wing: hind wing plain brown exteriorly, the discal portion being black and having a broad irregular transverse orange-yellow band. Head and front of thorax ferruginous; hind part of thorax and abdomen plain brown.

Expanse $5\frac{1}{2}$ inches.

Bengal. In Coll. A. E. Russell.

Genus *POTAMOPHORA*, Guen.

POTAMOPHORA MANLIA, Cram. Pap. Exot. i. pl. 92. f. A.

Genus *LYGNIODES*, Guen.

LYGNIODES HYPOLEUCA, Guen. Noct. iii. p. 125.

L. CILIATA, n. sp.

Male. Both wings of a uniform blackish velvety brown, bordered by well-defined cream-coloured cilia. Underside duller brown, with a discal line of ill-defined white-speckled spots, and a submarginal row of blackish spots, each bordered with a dentiform white mark; a blackish subbasal spot on both wings, and a white subapical spot on fore wing. Cilia as above.

Expanse 3 inches.

Bengal. In Coll. A. E. Russell.

Fam. *EREBIDÆ*.Genus *OXYODES*, Guen.

OXYODES CLYTIA, Cram. Pap. Exot. iv. pl. 399. f. 9.

Genus *SYRNA*, Guen.

SYRNA ALBILINEA, Walk. Cat. Lep. Het. B. M. xiv. p. 1261.

Silhet.

S. CÆLISPARSA, Walk. ib. p. 1262.

Assam.

S. CURVILINEA, n. sp. (Pl. VI. fig. 4.)

Female ferruginous brown: fore wing to the middle blackish ferruginous brown, marked with three very narrow transverse white lines, the first and second lines curved inward, the third obliquely straight and interrupted by an elongated constricted reniform mark; the second and third line is inwardly bordered by a similar lunulated

line, the interspace with a white discal dot, and in some specimens partly suffused with pale purplish white; a dark irregular submarginal ill-defined band which is medially confluent with the exterior margin, bordered without by a transverse sinuous black line; a marginal row of white-marked black dots: hind wing greyish cupreous brown, with decreasing pale ferruginous-brown black-bordered anal streaks, and marginal blackish white-marked dots; cilia ferruginous brown, with pale inner line. Underside dull ferruginous brown. Both wings with two transverse indistinct discal bands; a marginal row of black dots.

Expanse $2\frac{1}{8}$ inches.

Bengal. In Coll. A. E. Russell; F. Moore.

S. RECTILINEA, n. sp.

Male dark testaceous brown: fore wing with a medial darker brown oblique transverse band, straightly bordered on each side by a double slightly wavy white line, the outer line interrupted by a constricted reniform white mark; basal line white, indistinct; an irregular submarginal ill-defined dark band bordered without by a blackish sinuous line; a marginal row of white slightly black-marked dots: hind wing with a broad submarginal blackish decreasing band and two narrow inner lines; a marginal row of black-marked white dots; cilia with pale inner line. Underside with broad submarginal diffused dusky band, and inner pale-bordered black inner band; a pale-bordered black discal spot on hind wing; a marginal row of black dots.

Expanse $2\frac{1}{8}$ inches.

Bengal. In Coll. A. E. Russell.

S. CYANIVITTA, n. sp.

Male dark ferruginous brown: fore wing with an oblique transverse bluish-grey band, bordered on each side by a pale line, the outer line broken by a narrow reniform mark; subbasal line indistinct; an ill-defined transverse submarginal greyish-brown band irregularly bordered exteriorly by a black sinuous line; a narrow marginal bluish-grey sinuous line, the inner points being but slightly tipped with black: hind wing greyish cupreous brown, with a slight short white-bordered black streak from anal angle, and a narrow wavy marginal line; cilia ferruginous brown. Underside uniform brown.

Expanse $2\frac{1}{8}$ inches.

Bengal (*Sherwill*). In Coll. F. Moore.

Genus *TAVIA*, Walk.

TAVIA SUBSTRUENS, Walk. Cat. Lep. Het. B. M. xiv. p. 1276.

T. PUNCTOSA, Walk. ib. xxxiii. Suppl. iii. p. 939.

T. DUBITARIA, Walk. ib. p. 939.

T. CALIGINOSA, Walk. ib. p. 940.

T. ALBILINEA, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 940.

T. SUBMARGINATA, Walk. ib. p. 941.

T. BIOCULARIS, n. sp.

Male dark purplish fawn-colour: fore wing with several transverse undulating chalybeous-bordered black lunulated lines; submarginal points yellowish, black-marked, the lower white; costal dots yellowish; orbicular spot small, black-bordered, and with whitish centre; reniform spot prominent, circular, composed of black outer border, inner pure-white ring, and orange-yellow centre, and having a white dot above and below it: hind wing purple brown, slightly suffused with chalybeous.

Expanse 2 inches.

Bengal. In Coll. A. E. Russell.

T. CATOCALOÏDES, n. sp. (Pl. VII. fig. 3.)

Male ferruginous grey: fore wing with two very undulating transverse double lunulated brown lines—the first subbasal, the other beyond the middle, with the space between ferruginous and covered with short transverse blackish striæ; orbicular and reniform marks pale; a similar-coloured band across the disk, bordered without by a blackish line, which is nearly confluent in the middle with the exterior margin; submarginal spots large, brownish white and blackish-bordered: hind wing ferruginous yellow, from the base to the middle ferruginous brown, bordered by a black outer band; a broad submarginal discal band, blackish anteriorly, but formed of blackish-ferruginous striæ posteriorly; submarginal spots hardly apparent, being replaced by a blackish lunulated line; cilia interlined. Under-side ferruginous yellow: fore wing with three short medially transverse diffused black bands: hind wing with diffused discal and two narrow medial bands and large discal spot black; submarginal dots black; cilia blackish.

Expanse 3 inches.

Bengal (*Sherwill*). In Coll. F. Moore.

Genus ANISONEURA, Guen.

ANISONEURA SALEBROSA, Guen. Noct. iii. p. 161.

Silhet.

A. HYPOCYANA, Guen. ib. p. 162.

Silhet.

Fam. OMMATOPHORIDÆ.

Genus SPEIREDONIA, Hübn.

SPEIREDONIA FEDUCIA, Stoll, Cram. Pap. Exot. Suppl. v. pl. 36. f. 3.

Silhet.

S. ZAMIS, Stoll, Cram. Pap. Exot. Suppl. v. pl. 36. f. 11.
Silhet.

S. RETRAHENS, Walk. Cat. Lep. Het. B. M. xiv. p. 1294.
Sericia parvipennis, Walk. ib. p. 1297.

Genus PATULA, Guen.

PATULA MACROPS, Linn. (Cram. Pap. Exot. ii. pl. 171. f. A, B).
Noctua lupo, Fabr. (Donov. Ins. China, pl. . f. 1).

P. BOOPIS, Guen. Noct. iii. p. 178.
Silhet.

Genus ARGIVA, Hübn.

ARGIVA HIEROGLYPHICA, Drury, Ins. Exot. ii. pl. 2. f. 1; Don.
Ins. Ind. pl. 54. f. 2.

Phalæna mygdonia, Cram. pl. 174. f. F.
P. hermonia, Cram. pl. 74. f. E.

A. CAPRIMULGUS, Fabr. (Guen. Noct. iii. p. 180).

Genus NYCTIPAO, Hübn.

NYCTIPAO CREPUSCULARIS, Linn. (Clerck, Icon. pl. 53. f. 1-4;
Cram. ii. pl. 159. f. A, pl. 160. f. A).

N. GEMMANS, Guen. Noct. iii. p. 182.
Silhet.

N. GLAUCOPIS, Walk. Cat. Lep. Het. B. M. xiv. p. 1306.
Silhet.

N. OBLITERANS, Walk. ib. p. 1307, ♂.
N. exterior, Walk. ib. p. 1306, ♀.

Genus OMMATOPHORA, Guen.

OMMATOPHORA LUMINOSA, Cram. Pap. Exot. iii. pl. 274. f. D.

Fam. HYPOPYRIDÆ.

Genus SPIRAMA, Guen.

SPIRAMA HELICINA.

Spiredonia helicina, Hübn. Samml. exot. Schmett. iii. f. 437-8.

S. COHERENS, Walk. Cat. Lep. Het. B. M. xxiv. p. 1321.
? *S. retorta* (Linn.).

S. TRILOBA, Guen. Noct. iii. p. 197.
Hypopyra mollis, Guen. ib. p. 198.

Genus HYPOPYRA, Guen.

Syn. *Maxula*, Walk.

HYPOPYRA VESPERTILIO, Fabr. (Guen. Noct. iii. p. 199).

H. FENISECA, Guen. ib. p. 200.

Silhet.

H. OSSIGERA, Guen. ib. p. 201.

H. UNISTRIGATA, Guen. ib. p. 201, pl. 21. f. 1.

Maxula idonea, Walk. Cat. Lép. Het. B. M. xiv. Noct. p. 1327 ;
xxxiii. Suppl. iii. p. 1096.*Angerona poeusaria*, Walk. ib. xx. Geometr. p. 243.

Genus HAMODES, Guen.

HAMODES AURANTIACA, Guen. Noct. iii. p. 203.

Genus ENTOMOGRAMMA, Guen.

ENTOMOGRAMMA FAUTRIX, Guen. Noct. iii. p. 204.

Genus BEREGRA, Walk.

BEREGRA REPLENENS, Walk. *l. c.* xiv. p. 1315.

Fam. BENDIDÆ.

Genus HULODES, Guen.

HULODES CARANEA, Cram. Pap. Exot. iii. pl. 269. f. E, F.

H. RESTORENS.

Hypopyra restorens, Walk. Cat. Lep. Het. B. M. xiv. p. 1328.? *Hulodes drylla*, Guen. Noct. iii. p. 209, pl. 24. f. 10.

H. INANGULATA, Guen. ib. p. 210.

Silhet.

H. PALUMBA, Guen. ib. p. 211.

Remigia colligens, Walk. *l. c.* xxxiii. Suppl. iii. p. 1019.

Fam. OPHIUSIDÆ.

Genus SPHINGOMORPHA, Guen.

SPHINGOMORPHA CHLOREA, Cram. Pap. Exot. ii. pl. 104. f. C.

S. sipyla, Guen. Noct. iii. p. 222.

Genus IONTHA, Doubleday.

IONTHA UMBRINA, Doubleday, Entomologist, p. 298.

Silhet.

Genus LAGOPTERA, Guen.

LAGOPTERA HONESTA, Hübn. Samml. exot. Schmett. ii. Noct. iii. 1. f. 1, 2.

Balasure.

L. MAGICA, Hübn. ib. iii. f. 535.

Maungbhoom.

L. DOTATA, Fabr. (Van der Hoeven, Léop. Nouv. pl. 4. f. 3).

Genus OPHIODES, Guen.

OPHIODES TRAPEZIUM, Guen. Noct. iii. p. 231.

O. SEPARANS, Walk. Cat. Lep. Het. B. M. xiv. p. 1357.

O. TRIPHLENOIDES, Walk. ib. p. 1358.

O. CUPREA, n. sp.

Female greyish cupreous brown; luteous and glossy beneath: fore wing numerously studded with black scales; two transverse pale luteous lines, which are widely separate on the costa, but contiguous on the hind margin; reniform spot brown, with a pale luteous line; a transverse submarginal less distinct luteous line terminated anteriorly by two jet-black dentate spots; cilia brown, with a narrow pale inner line: hind wing luteous brown, with a cupreous gloss; exterior border dark brown; cilia luteous.

Expanse 2 inches.

Bengal (*Sherwill*). In Coll. F. Moore.

Genus OPHISMA, Guen.

OPHISMA GRAVATA, Guen. Noct. iii. p. 237.

O. MATURESCENS, Walk. Cat. Lep. Het. B. M. xiv. p. 1382.

Genus COTUZA, Walk.

Syn. *Ginea*, Walk.; *Sympis*, part., Guen.

COTUZA UMMINIA.

♀. *Phal. Noctua umminia*, Cram. Pap. Exot. iii. pl. 267. f. F.

Ophisma umminia, Walk. Cat. Lep. Het. B. M. xiv. p. 1384.

♀. *Sympis subunita*, Guen. Noct. iii. p. 344; Walk. l. c. xv. p. 1549.

♂. *Cotuzza drepanoides*, Walk. ib. p. 1552.

♀. *Ginea removens*, Walk. ib. p. 1638.

Remark.—The larva of *C. umminia* differs considerably from that of *Sympis rufibasis*, and is very similar in appearance to the larva of the genus *Naxia*.

C. DEFICIENS. (Pl. VII. fig. 1.)

Ophisma deficiens, Walk. ib. xiv. p. 1383.

Remigia perfidiosa, Walk. Cat. Lep. Het. B. M. xiv. p. 1511.
Ophisma cumulifera, Walk. MS. B. M. Coll.

Genus HEMEROBLEMMA, Hübn.

HEMEROBLEMMA PEROPACA, Hübn. Samml. exot. Schmett. iii. f. 541-2.

Ophisma latabilis, Guen. Noct. iii. p. 241.

Genus ACHÆA, Hübn.

ACHÆA MELICERTE, Drury, Ins. i. pl. 23. f. 1; Cram. Pap. Exot. iv. pl. 323. f. C, D.

A. MERCATORIA, Fabr. (Cram. Pap. Exot. iv. pl. 323. f. E).

Genus SERRODES, Guen.

SERRODES CAMPANA, Guen. Noct. iii. p. 252.

Genus NAXIA, Guen.

NAXIA CIRCUMSIGNATA, Guen. ib. p. 255.
 Silhet.

N. ONELIA, Guen. ib. p. 258.

Ophiusa obumbrata, Walk. l. c. xxxiii. Suppl. iii. p. 969.
O. umbrosa, Walk. ib. p. 968.

N. CALEFACIENS, Walk. ib. xiv. p. 1405.

N. CALORIFICA, Walk. ib. p. 1406.
 Silhet.

Genus CALESIA, Guen.

CALESIA COMOSA, Guen. Noct. iii. p. 258.

C. GASTROPACHOIDES, Guen. ib. p. 258.

Genus HYPÆTRA, Hübn.

HYPÆTRA NOCTUOIDES, Guen. Noct. iii. p. 259.
 Silhet.

II. GAMMOIDES.

Trigonodes gammoïdes, Walk. l. c. xv. p. 1833.
Poaphila hamata, Walk. MS. B. M. Coll.

Genus ATHYRMA, Hübn.

ATHYRMA POLYSPILA, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 966.
 Silhet.

A. DIVULSA, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 966. Silhet.

A. TESSELLATA, n. sp.

Male greyish brown : fore wing with a large patch from the base to the middle and a broad transverse discal band blackish brown, bordered by a pale yellow narrow line, the space between them being grey, the former intersected by an irregular-quadriform narrow yellow line, and the latter crossed by yellowish and traversed in its entire length by a nearly straight line terminating near the produced angle of the former ; a marginal row of similar-coloured dentiform spots bordered with a narrow pale yellow line : hind wing greyish brown. Head and thorax blackish brown, narrowly fringed with pale yellow. Abdomen grey. Cilia spotted with brown.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell.

Genus OPHIUSA, Guen.

O. MYOPS, Guen. Noct. iii. p. 265.

O. SIMILLIMA, Guen. ib. p. 266.
Silhet.

O. JOVIANA, Cram. Pap. Exot. iv. pl. 399. f. B.

O. ALBIVITTA, Guen. Noct. iii. p. 271.

O. ACHATINA, Sulz. Ins. pl. 22. f. 4 ; Cram. Pap. Exot. iii. pl. 288. f. A.

O. FULVOTENIA, Guen. Noct. iii. p. 272.
Silhet.

O. ARCTOTENIA, Guen. ib. p. 272.
Silhet.

O. STUPOSA, Fabr. (Cram. Pap. Exot. pl. 273. f. E, nec pl. 288. f. A).
Silhet.

Genus GRAMMODES, Guen.

GRAMMODES STOLIDA, Fabr. (Guen. Noct. iii. p. 276).

G. AMMONIA, Cram. Pap. Exot. iii. pl. 250. f. D.

G. MYGDON, Cram. ib. ii. pl. 156. f. G.

G. NOTATA, Fabr. (Walk. Cat. Lep. Het. B. M. xiv. p. 1445).

Genus FODINA, Guen.

FODINA ORIOIUS, Guen. Noct. iii. p. 274.

F. PULLULA, Guen. ib. p. 275.

Fam. EUCLIDIDÆ.

Genus TRIGONODES, Guen.

TRIGONODES HYPPASIA, Cram. Pap. Exot. iii. pl. 250. f. E.

Fam. REMIGIDÆ.

Genus REMIGIA, Guen.

REMIGIA ARCHESIA, Cram. Pap. Exot. iii. pl. 273. f. F, G, ♀.

Ph. Noct. virbia, Cram. ib. f. II, ♂.*Remigia bifasciata*, Walk. Cat. Lep. Het. B. M. Suppl. iii. p. 1014.

R. FRUGALIS, Fabr. (Guen. Noct. iii. p. 314).

Chalciope lycopodia, Geyer, Zutr. Exot. Schmett. 25. f. 897.

Genus FELINIA, Guen.

FELINIA TERMINIGERA, Walk. l. c. xv. p. 1850.

F. SPISSA, Guen. Noct. iii. p. 322.

Silhet.

Tribe PSEUDO-DELTOIDES.

Fam. THERMESIDÆ.

Genus SYMPIS, Guen.

SYMPIS RUFIBASIS, Guen. Noct. iii. p. 344.

Silhet. In Coll. A. Grote, Esq.

Larva feeds on the Lichee (*Nephelium litchi*); pupa within rolled end of leaf.

Genus THERMESIA, Hübn.

THERMESIA CREBERRIMA, Walk. Catal. Lep. Het. B. M. xv. p. 1574.

Silhet.

T. PRÆCIPUA, Walk. ib. xxxiii. Suppl. iii. p. 1056.

Silhet.

T. ARENACEA, Walk. ib. p. 1056.

Silhet.

T. CONSOCIA, Walk. ib. p. 1057.

Silhet.

T. RETICULATA, Walk. ib. p. 1062.

Drepanodes scitaria, Walk. ib. xxvi. Geom. p. 1488.*Anisodes pyrinata*, Walk. ib. p. 1582.Darjeeling (*W. S. Atkinson*).Larva feeds on *Eleocarpus serratus*.—A. Grote, Esq.

Genus AZAZIA, Walk.

AZAZIA RUBRICANS.

Ophiusa rubricans, Boisd. (Guen. Noct. iii. p. 356).

Azazia rubricans, Walk. Cat. Lep. Het. B. M. xv. p. 1576.

Thermesia transducta, Walk. ib. xxxiii. Suppl. iii. p. 1058.

Genus SELENIS, Guen.

Syn. *Mestleta*, Walk.

SELENIS IRRECTA, Walk. ib. p. 1066.

Selenis niviapex, Walk. ib. p. 1069.

S. ABRUPTA.

Mestleta abrupta, Walk. ib. p. 829.

Larva feeds on *Zizyphus*, apparently only on the flowers.—*A. Grote, Esq.*

Genus MARMORINIA, Guen.

MARMORINIA SINGHA, Guen. Noct. iii. p. 372.

Silhet.

M. SHIVULA, Guen. ib. p. 372.

Silhet.

Genus MECODINA, Guen.

MECODINA LANCEOLA, Guen. ib. p. 373.

Silhet.

Genus SINGARA, Walk.

SINGARA DIVERSALIS, Walk. *l. c.* p. 1113.

Silhet.

Genus HYPERNARIA, Guen.

HYPERNARIA DISCISTRIGA, n. sp.

Female dull yellowish ferruginous, brownish apically, minutely irrorated with blackish scales: fore wing with an oblique brown line crossing both wings from the apex to the middle of abdominal margin, the line bordered within with ferruginous and a pale inner margin; three short costal diffused dusky streaks, and lunulated discal mark, before the latter is a black dot. Head and front of thorax blackish. Underside brighter-coloured, with two oblique lunulated dusky lines crossing both wings.

Expanse $2\frac{3}{8}$ inches.

Bengal. In Coll. A. E. Russell.

Remark.—This insect has much the appearance of *Ophisma atticola*, Walk. Cat. Lep. B. M. p. 1383.

Genus FASCELLINA, Walk.

FASCELLINA CHROMATARIA, Walk. Cat. Lep. Het. B. M. xx. Geometr. p. 215.

Nysis lata, Walk. MS. B. M. Coll.

F. VIRIDIS, n. sp. (Pl. VII. fig. 4.)

Female green, paler beneath, the hind wing being yellow: fore wing with a discal spot, oblique streak beneath, and a broad exterior patch from below the apex brown, the latter with a curved transverse discal narrow ferruginous-brown chain-like band: hind wing with a straight transverse band and a narrow curved discal line of ferruginous brown. Head and thorax green. Abdomen pale ferruginous brown. Underside—both wings basally and the hind wing exteriorly minutely striated with purplish brown: fore wing with an exterior dark purple-brown patch having a small yellow spot near posterior angle, along its inner margin is a transverse narrow black-bordered silvery lunulated line terminating before the costa: hind wing with a straight purple-brown band and curved line as above.

Expanse $1\frac{4}{12}$ inch.

Bengal. In Coll. F. Moore.

Fam. FOCILLIDÆ.

Genus ZETHES, Ramb.

ZETHES XYLOCHROMA, Walk. Cat. Lep. Het. B. M. xv. p. 1525. Silhet.

Z. PERTURBANS, Walk. ib. p. 1525.

Silhet.

Genus PHALACRA, Walk.

PHALACRA METAGONARIA, Walk. ib. xxxv. Suppl. v. p. 1639.

Larva in strong web in rolled leaf. Feeds on dates.—*A. Grote, Eq.*

Genus THYRIDOSPILA, Guen.

THYRIDOSPILA SPHERIPHORA, n. sp.

Female greyish fawn-colour: fore wing with two medial transverse ill-defined black narrow sinuous lines, each curved inward to the costa; between the bands is a parallel medial diffused blackish line passing the reniform mark; a triangular reddish-brown patch before the apex, which also descends the submargin; orbicular and reniform spots semitransparent and yellowish; orbicular spot with a small attached upper portion; reniform spot transversely narrow, bent in the middle and joined at each end to a semicircular blackish line; a submarginal row of blackish points and marginal row of lunules: hind wing reddish brown exteriorly; three indistinct narrow blackish transverse sinuous lines; cilia edged with grey. Underside

paler, specked with brown : fore wing somewhat ferruginous ; markings as above ; the transverse lines with diffused greyish outer borders. Legs grey, brown-speckled.

Expanse $1\frac{5}{8}$ inch.

Bengal. In Coll. A. E. Russell ; F. Moore.

Genus PHURYS, Guen.

PHURYS OBLIQUA, n. sp.

Male brownish fawn-colour : fore wing with a blackish streak obliquely from the apex to the middle of the posterior margin, where it is the widest ; two short oblique subbasal reddish-brown streaks, a similar undulating streak bordering each side of the black one, beyond which are two other dusky streaks ; a small discal dot and reniform spot reddish brown : hind wing with five transverse dusky brown streaks, the second and fourth pale-bordered ; cilia with a pale inner line. Head and front of thorax reddish brown. Abdomen greyish brown.

Expanse $1\frac{7}{8}$ inch.

Bengal. In Coll. A. E. Russell.

P. STRIGATA, n. sp.

Female pale yellowish testaceous : fore wing with a narrow pale transverse line broadly bordered externally with brown from before the apex to before the middle of posterior margin, the rest of the wing covered with transverse lines of delicate brown strigæ ; a marginal row of brown dots : hind wing brownish basally, dark brown from the apex, the anal angle with short brown strigæ. Underside brighter-coloured, with delicate short strigæ ; both wings with a blackish discal spot and a suffused blackish-brown submarginal band, which on the fore wing branches out to the exterior margin.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. F. Moore.

Genus EGNASIA, Walk.

EGNASIA EPHYRODALIS, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 217.

E. TRIMANTESALIS, Walk. ib. p. 220.

Darjeeling.

E. VAGA.

Thermesia vaga, Walk. ib. xxxiii. Suppl. iii. p. 1057.

Silhet.

Fam. AMPHIGONIDÆ.

Genus LACERA, Guen.

LACERA CAPELLA, Guen. Noct. iii. p. 337.

Genus AMPHIGONIA, Guen.

AMPHIGONIA COMPRIMENS, Walk. Cat. Lep. Het. B. M. xv. p. 15-40.
Silhet.

Tribe DELTOIDES.

Fam. PLATYDIDÆ.

Genus EPISPARIS, Walk. Cat. x. p. 476 (1856).

Syn. *Neviasca*, Walk. (1858); *Pradiota*, Walk. (1866).

EPISPARIS VARIALIS.

Neviasca variialis, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 7.
Episparis signata, Walk. ib. xxxiii. Suppl. iii. p. 1032.

E. SEJUNCTALIS.

Pradiota sejunctaria, Walk. ib. xxxiv. Suppl. iv. p. 1572.
P. ennomocoides, Walk. MS. B. M. Coll.

E. TORTUOSALIS, n. sp. (Pl. VII. fig. 5.)

Male purplish brown above, greyish brown anteriorly; numerous marked with short narrow black strigæ: fore wing with two medial transverse dark purple-brown narrow bands, the inner one bent outwardly in the middle, the exterior band broadly elbowed outwards and then retracting to the costa; both bands with a narrow whitish-out-bordered line; between the bands is a very small indistinct white-bordered black "orbicular" spot and a narrow white "reniform" lunule; before the apex are two transverse narrow whitish lines with ill-defined dark bands between them, all retracting to the costa: hind wing with an irregular transverse whitish submarginal line, the space posteriorly between which and the exterior margin is ferruginous; a dark medial indistinct band. Underside greyish brown, narrow transverse strigæ numerous and distinct: fore wing with a dark chocolate-brown interiorly angled apical patch, with a whitish-bordered line; proceeding from the angle is an indistinct whitish streak to the base of the wing; orbicular spot white; reniform lunule with a black centre: hind wing with a whitish medial space, within which is a prominent black discal spot. Abdomen white at the base beneath. Middle tarsi white. Hind legs partly white.

Expanse $2\frac{1}{8}$ inches.

Bengal (*Sherwill*). In Coll. F. Moore.

Fam. HYPENIDÆ.

Genus DICHROMIA, Guen.

DICHROMIA OROSIALIS, Cram. Pap. Exot. pl. 275. f. D.

D. TRIPLICALIS, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 16.
Darjeeling.

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TALAPA, n. g., Moore.

Female robust. Palpi porrect, compressed, pilose; second joint recurved upwards and outwards, extending beyond the head; third joint two-thirds the length of the second, straight, slender. Antennæ very minutely pectinated. Legs slightly pilose; mid tibiæ with one pair and hind tibiæ with two pairs of long slender spurs. Body stout. Abdomen extending beyond the angle of the hind wing. Wings ample: fore wing broad; costa nearly straight; apex acute; exterior margin wavy, oblique, angled in the middle: hind wing broad; anterior angle rounded; exterior margin wavy, slightly angled hindward.

TALAPA CALIGINOSALIS. (Pl. VII. fig. 6.)

Remigia caliginosa, Walk. Cat. Lep. Het. B. M. xxxiii. Suppl. iii. p. 1017.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson; F. Moore.

ANORATHA, n. g., Moore.

Male and *female* slender. Palpi porrect, long, covered with short hairs of equal length, compressed; second joint straight, slightly recurved in the female, ascending upward and outward to the level of the vertex, and extending half its length beyond the head; third joint one-third the length of the second, fusiform. Antennæ minutely pectinated in the male, simple in the female. Legs very long, slender, mostly smooth; mid tibiæ with one pair and hind tibiæ with two pairs of long slender spurs. Body slender. Abdomen long, attenuated, and in the male extending nearly half its length beyond the angle of the hind wing. Wings long, narrow.

Male. Costa elongated, straight; apex slightly falcate; exterior margin very oblique, slightly angled in the middle; hind margin half the length of the costa. Hind wing arched at the base and near the apex; anterior margin extending considerably beyond the posterior angle of the fore wing; apex rounded; exterior margin produced and angled in the middle.

Female. Apex falcated; exterior margin less oblique, but more angled in the middle; posterior margin longer, two-thirds the length of the costa. Hind wing somewhat less produced apically; apex more acute; exterior margin recurved; abdominal margin longer.

ANORATHA COSTALIS, n. sp. (Pl. VII. fig. 9.)

Male and *female* cupreous brown.

Male. Costal border broadly pinkish white; an indistinct brown short oblique medial streak, a narrow reniform mark, and a distinct pinkish-white outer-bordered very oblique transverse narrow discal band; an irregular submarginal row of blackish spots with whitish outer borders: hind wing and abdomen pale cinereous cupreous brown, with an indistinct partly transverse discal pale streak. Front of head and sides of thorax fringed with white. Underside brown:

hind wing with narrow indistinct discal spot and outer recurved transverse band.

Female. Fore wing darker; costal and transverse discal band ochreous, both well defined; the black submarginal spots without white borders: hind wing with the transverse discal pale narrow band more distinct. Underside as in male.

Expanse $1\frac{1}{8}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

Genus HYPENA, Schr.

HYPENA LACESSALIS, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 59.

H. ABDUCALIS, Walk. ib. p. 66.

H. CONSCITALIS, Walk. ib. xxxiv. Suppl. iv. p. 1509.

Cherra Poonjee.

H. EXTENSA, Walk. ib. p. 1139.

H. TENEBRALIS, n. sp.

Male and *female* blackish cupreous brown: fore wing chalybeous-speckled, and indistinctly marked with short blackish strigæ; a medial transverse brown band with pale-bordered black marginal line; orbicular and reniform spots black; a submarginal row of posteriorly decreasing black spots, which are exteriorly bordered with white speckles; apex white-speckled, beneath which is a black streak: hind wing and abdomen paler brown. Abdomen with dark brown dorsal tufts. Underside uniform brown: fore wing with a white spot before the apex: hind wing with a black discal mark and two indistinct narrow outer bands.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. W. S. Atkinson; F. Moore.

H. CERVINALIS, n. sp.

Male and *female* fawn-colour: fore wing with numerous narrow transverse delicate indistinct black strigæ; two medial transverse ochreous-brown pale-bordered lines; orbicular spot white; reniform spot black; an indistinct black spot before the apex; marginal line dark; cilia with a pale inner line. Underside paler; short brown strigæ and blackish discal spot on the hind wing, which are less apparent on the fore wing. Palpi and front of head blackish.

Expanse $1\frac{1}{2}$ inch.

Bengal. In Coll. A. E. Russell; W. S. Atkinson.

II. COSTINOTALIS, n. sp.

Male and *female* ferruginous; minutely and indistinctly black-speckled: fore wing with three equidistant pure-white costal spots; both wings with a black discal dot, outer transverse black-speckled wavy line, and marginal rows of dots; cilia reddish. Top of the head white. Antennæ with a row of white dots along the base of

the shaft. Underside pale brown; discal spot, outer transverse line, and marginal dots less defined than above.

Expanse 1 inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

II. CASTANEALIS, n. sp.

Male and *female* dull chestnut-brown: fore wing suffused with chalybeous, with two oblique medial transverse chalybeous-brown lines bordered by a chalybeate outer line, the inner line zigzag, the outer bent outward before its middle; a submarginal row of indistinct black spots with chalybeous outer borders; a chalybeous streak before the apex, and a similar patch at the posterior angle: hind wing and abdomen cinereous brown; marginal line darker. Palpi, front of head, legs, and costa beneath ochreous. Underside—fore wing cinereous brown: hind wing greyish brown.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

II. RECTIVITTALIS, n. sp.

Female pale testaceous: fore wing with numerous short delicate brown transverse strigæ; a distinct brown straight transverse submarginal narrow double band; a small black-marked white orbicular spot. Front of head and tuft of palpi above hoary. Palpi brown. Cilia brown. Underside paler, minutely speckled.

Expanse 1 inch.

Bengal. In Coll. A. E. Russell.

II. BASISTRIGALIS, n. sp.

Male and *female* greyish brown; exterior border of fore wing white-speckled: fore wing with a large cupreous-brown patch, the outer border of which has a double white marginal line commencing from the costa one-third from the apex, curving obliquely towards the exterior margin, where it is much bent, and then retracting to the posterior margin one-third from the angle, where it meets a white streak recurved from the base of the costa; a brown streak from the angle of the patch to the apex; a submarginal series of indistinct white-speckled spots; indistinct blackish orbicular and reniform spots. Underside paler: fore wing with an indistinct darker discal spot, and a white dot at the apex: hind wing brown-speckled, with a discal spot and paler outer line.

Expanse $1\frac{1}{4}$ inch.

Cherra Poonjee; Darjeeling. In Coll. W. S. Atkinson; F. Moore.

II. DIVISALIS, n. sp.

Female. Fore wing dark chestnut-brown; exterior border fawn-colour, with a transverse discal narrow slightly bent purple-white line, having a diffused pale purplish-pink outer border; a submarginal row of indistinct white-speckled black spots; a short recurved indistinct pale purplish-white streak from the base of the wing; an indistinct dusky streak below the apex: hind wing and abdomen

cinereous brown. Underside fuliginous brown: fore wing with two white-marked black subapical dots and indistinct transverse discal band: hind wing with a more distinct discal spot and outer curved band.

Expanse $1\frac{3}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

H. LONGIPENNIS, Walk. Catal. Lep. Het. B. M. xxxiv. Suppl. iv. p. 1139.

Darjeeling.

Fam. HERMINIDÆ.

Genus HERMINIA, Latr.

HERMINIA HADENALIS, n. sp.

Male greyish brown: fore wing with two medial transverse black-speckled-bordered pale lines, a round black orbicular dot, and a triangular reniform spot; the inner line nearly straight, the outer recurved and at each end with an exterior black patch; a black zigzag submarginal line and a marginal row of dots: hind wing with indistinct blackish pale-bordered streaks from anal angle; a marginal row of black dots. Underside paler, with indistinct dark transverse sinuous pale-bordered lines and blackish discal spot; a row of marginal lunules. Palpi and legs dark brown.

Expanse $1\frac{3}{10}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

H. OCHRACEALIS, n. sp.

Female ochraceous, palest exteriorly: fore wing with a medial transverse subdued dusky band, which passes over an indistinct reniform spot; a similar submarginal band extending to the apex and passing through a black subapical spot; between the bands is a recurved series of black dots; exterior margin with a row of black dots: hind wing pale ochraceous white, with a narrow upper and a diffused lower blackish streak from above the anal angle; a narrow blackish lunular marginal line; cilia ochraceous. Abdomen dusky, with narrow white segmental bands; tip ochraceous. Underside ochraceous, black-speckled: fore wing dusky at the base; a black discal and subapical spot, and transverse sinuous line: hind wing with black discal spot, transverse sinuous line, and outer row of spots.

Expanse $1\frac{3}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

H. ? ALBIRENALIS, n. sp.

Male and *female* black brown: fore wing with three indistinct black medial transverse bands with chalybeate white-speckled borders, the outer borders sinuous and more prominently speckled; reniform spot white; a white-speckled zigzag submarginal line; a speckled patch below the apex, and a few speckles along the anterior margin: hind wing paler, with short indistinct black sinuous bands

with white-speckled borders from the anal angle; cilia with white spots. Underside paler, marked as above. Palpi in the male porrect, compressed; second joint long, slender, and bent at the apex, squamous, tufted above at the end; third joint short, one-third the length of the second, fusiform, tufted above: in the female erect, curved; first and second joints squamous; third joint very slender, naked, nearly the length of the second. Antennæ in the male fixed on a short pedestal, serrated and pectinated; base curved; shaft tumid near the base; in the female minutely pectinated.

Expanse, ♂ $1\frac{5}{8}$, ♀ $1\frac{1}{2}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Genus MASTYGOPHORA, Poey.

MASTYGOPHORA? SCOPIGERALIS, n. sp.

Male brown: fore wing with a pale yellowish-brown oblique transverse band with wavy dark brown borders, the exterior formed by a double line with posterior black streaks; within the band is a brown indistinct reniform streak; orbicular spot small, whitish. Both wings with a submarginal transverse wavy sinuous pale line with black points, and a less distinct similar marginal line. Underside ochreous white, with broad brown exterior borders, narrow transverse sinuous line and short discal streak, and a pale sinuous line crossing the exterior borders. Legs blackish. Tuft of palpi pale ochreous.

Expanse $1\frac{1}{2}$ inch.

Bengal (*Sherwill*). In Coll. F. Moore.

Remark.—This species may be known by its enormously lengthened palpi (in the male), the third joint of which has a brush-like tuft of very long silky hairs beneath.

Genus ECHANA, Walk.

ECHANA PLICALIS, n. sp. (Pl. VII. fig. 7.)

Male and *female* brownish fawn-colour, slightly glossy; costal fold darker: fore wing with two indistinct yellowish narrow imperfect denticulated lines—the first from beneath the fold, the other beyond it, both indistinctly crossing the hind wing, on the underside of which they are more distinct and have a dark inner border, there being also a short dark subbasal streak; cilia with a pale inner narrow line.

Expanse $1\frac{1}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Remark.—The species of this genus may be known by the fore wing having in both sexes a large subfusiform costal raised fold above, and the dislocation of the contiguous veins.

Genus LOCASTRA, Walk.

LOCASTRA PHERECIUSCALIS, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 159.

Silhet.

L. CUPROVIRIDALIS, n. sp.

Female. Fore wing coppery green; two medial transverse black sinuous lines, the inner line with a black spot at the base and another above it; middle of the wing between the lines whitish, green-speckled; the orbicular and reniform spots black, conjoined; a marginal row of alternate black and white spots; cilia spotted with black opposite to the white marginal spots: hind wing white, with a broad fuliginous cupreous-brown exterior band. Thorax coppery green. Abdomen blackish, speckled with white. Palpi tipt with white. Underside white; both wings with a broad brown exterior band; discal spot on hind wing and base of costa brown; marginal dots white. Legs blackish green, each joint tipt with white.

Expanse $1\frac{1}{2}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Genus BERTULA, Walk.

BERTULA HISBONALIS, Walk. Cat. Lep. Het. B. M. xvi. Delt. p. 164.

Silhet.

B. BREVVITALIS, n. sp.

Male blackish brown: fore wing with two transverse narrow yellow bands, a small black orbicular spot, and a large reniform spot; first band upright, the second oblique; an irregular wavy submarginal yellowish line with a longitudinal short straight yellow streak below the apex; a marginal row of triangular black spots: hind wing paler, with rather indistinct blackish discal spot, a curved outer pale-bordered narrow yellow band, and submarginal similar sinuous band; a row of blackish marginal lunules. Palpi edged with yellow. Legs blackish, spotted with yellow.

Expanse $1\frac{2}{5}$ inch.

Bengal. In Coll. A. E. Russell.

B. CHALYBEALIS, n. sp. (Pl. VII. fig. 8.)

Male and *female* dark chestnut-brown, more or less suffused with chalybeous: fore wing with two narrow pale-inner-bordered darker brown oblique transverse bands, between which is a narrow reniform mark; an indistinct submarginal irregular wavy narrow brown band: hind wing with pale-bordered narrow transverse discal band, a less distinct inner discal mark, and outer submarginal irregular brown band; cilia greyish-speckled. Underside paler, speckled with grey. Thorax and palpi chestnut-brown, the latter fringed with white in the male.

Expanse $1\frac{5}{8}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

B. STIGMATALIS, n. sp.

Male and *female* dark fuliginous brown: fore wing with two widely separated medial transverse blackish lines, the inner line nearly

straight, the outer wavy, both bordered exteriorly with a chalybeous-speckled double band; a chalybeous-speckled black band at the base of the wing, and two similar submarginal wavy bands; orbicular and reniform spots large, black; a marginal row of black lunules: hind wing and abdomen paler; some whitish-bordered black sinuous streaks from the anal angle; marginal lunular line blackish. Under-side brown: hind wing with two black discal spots and three outer indistinct sinuous bands. Palpi in the male stout, reflexed over the head, extending beyond the thorax, furnished with dense soft hairs along the length resting on the thorax; second and third joints slightly curved, of equal length; third joint ensiform: in the female slender, squamous, curved upwards; third joint subulate, nearly as long as the second. Antennæ in the male pectinated, the pectinations formed of fascicles of fine bristles; in the female minutely serrated.

Expanse $1\frac{3}{10}$ inch.

Bengal. In Coll. W. S. Atkinson; F. Moore.

Genus BOCANA, Walk.

BOCANA BASALIS, n. sp.

Female dark fuliginous brown: fore wing with the base dull ferruginous and brown-speckled; a submarginal row of small yellow spots: hind wing and abdomen pale fuliginous brown. Thorax streaked with ferruginous at the sides in front. Palpi ferruginous, black-speckled. Underside paler; costa and hind wing whitish-speckled: fore wing with the costa near the apex slightly ferruginous; a short whitish costal streak before the apex: hind wing with dark brown discal spot and two outer whitish-bordered narrow bands. Both wings above and beneath with a black lunular marginal line. Body and legs blackish brown; legs with ferruginous spots.

Expanse $1\frac{1}{3}$ inch.

Bengal. In Coll. A. E. Russell.

B. VIRIDALIS, n. sp.

Female dull green: fore wing thickly black-speckled, the speckles forming some black streaks at the base; a double wavy transverse line before the middle, and some transverse patches beyond and on the submargin; a black discal spot and a black-speckled white spot near the posterior angle: hind wing and underside dull pale cupreous brown. Legs, thorax beneath, and palpi ochreous white.

Expanse $1\frac{2}{8}$ inch.

Bengal (*Sherwill*). In Coll. F. Moore.

B. QUADRILINEALIS, n. sp.

Male brown: fore wing suffused with grey; four transverse dark brown narrow lines, the first subbasal and nearly upright, the others inwardly oblique; the second line between a black "orbicular" and a "reniform" dot; a submarginal indistinct zigzag brown line: hind wing cupreous brown. Anal tuft pale ochreous.

Expanse $1\frac{3}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson.

B. MURINALIS, n. sp.

Allied to *B. turpitalis*.

Female yellowish brown: fore wing somewhat greyish brown at the base; a brown subbasal transverse outwardly oblique narrow irregular line; a straight transverse discal sinuous line, and a pale-bordered straight submarginal line; a small dark brown orbicular and reniform spot: hind wing duller brown, with an indistinct narrow whitish streak from anal angle. Underside dull brown, with an indistinct discal spot, and two narrow outer transverse brown bands. Palpi blackish.

Expanse $1\frac{7}{10}$ inch.

Bengal. In Coll. F. Moore.

Tribe PYRALES.

Fam. PYRALIDÆ.

Genus PYRALIS, Linn.

PYRALIS LUCILLALIS, Walk. Cat. Lep. Het. B. M. xvii. Pyral. p. 268.

Darjeeling (*W. S. Atkinson*).

P. SUFFUSALIS, Walk. ib. xxxiv. Suppl. iv. p. 1235.

Calcutta (*W. S. Atkinson*).

Genus HERCULIA, Walk.

HERCULIA BRACTEALIS, Walk. ib. xix. Pyral. p. 808.

Genus AGLOSSA, Latr.

AGLOSSA ARGENTALIS, n. sp.

Female. Fore wing silvery white; two oblique medially transverse blackish sinuous lines, the interspace being fuliginous brown, except the costal portion nearest the apex; base of wing and exterior border partly fuliginous brown, the latter traversed by a white lunular line; a row of black marginal spots; cilia white, with fuliginous-brown edge and inner spots: hind wing cinereous. Head and thorax white, the latter with fuliginous spots. Abdomen cinereous brown. Palpi white above, fuliginous beneath. Underside cinereous brown: hind wing paler and with a short brown discal mark. Legs fuliginous, each joint tipped with white.

Expanse $1\frac{3}{4}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

Fam. ENNYCHIDÆ.

Genus PYRAUSTA, Schr.

PYRAUSTA SILHETALIS, Guen. Delt. et Pyr. p. 166; Walk. Cat. Lep. Het. B. M. xvii. p. 311.

Botys silhetalis, Lederer, Wien. ent. Monat. vii. p. 364.

Genus RHODARIA, Guen.

RHODARIA CONCATENALIS, Walk. Cat. Lep. Het. B. M. xxxiv. Suppl. iv. p. 1284.

Darjeeling.

Fam. ASOPIDÆ.

Genus CHNAURA, Lederer.

CHNAURA OCTAVIALIS.

Syngamia octavialis, Walk. *l. c.* xvii. p. 334.

Chnaura octavialis, Lederer, Wien. ent. Monat. vii. p. 435, t. 17. f. 4. Darjeeling (*W. S. Atkinson*).

Genus SAMEA, Guen.

SAMEA GRATIOSALIS, Walk. *l. c.* xvii. p. 357.

Darjeeling (*W. S. Atkinson*).

Genus AGATHODES, Guen.

AGATHODES OSTENTALIS.

Perinephela ostentalis, Geyer, Hübner. Zutr. Samml. exot. Schmett. f. 833.

Agathodes ostentalis, Guen. Delt. et Pyral. p. 208.

Genus TERASTIA, Guen.

TERASTIA DIVERSALIS.

Agathodes diversalis, Walk. *l. c.* xxxiv. Suppl. iv. p. 1307.

Darjeeling (*W. S. Atkinson*).

Genus LEUCINODES, Guen.

LEUCINODES ORBONALIS, Guen. Delt. et Pyral. p. 223.

Fam. HYDROCAMPIDÆ.

Genus OLIGOSTIGMA, Guen.

OLIGOSTIGMA CRASSICORNALIS, Guen. Delt. et Pyral. p. 261; Walk. *l. c.* xvii. p. 433.

Hydrocampa crassicornalis, Lederer, Wien. ent. Monat. vii. p. 451.

Oligostigma tripunctalis, Walk. *l. c.* xxxiv. Suppl. iv. p. 1531.

Genus HERDONIA, Walk.

HERDONIA OSACESALIS, Walk. *l. c.* xix. p. 964.

Silhet; Darjeeling.

Genus HYDROCAMPA, Latr.

HYDROCAMPA PULCHRALIS, n. sp.

Male and female pale straw-yellow: fore wing with some small

ill-defined spots at the base ; a quadrate spot at the end of the cell, two larger spots beyond it, one being below the latter, and some outer very small indistinctly defined spots and a wavy marginal line, all the interspaces being dark brown : hind wing with a dark brown discal spot, and a marginal band enclosing a large anterior spot and smaller lower spots ; cilia alternate white and brown. Palpi above, head, and thorax brown. Abdomen with narrow white segmental bands. Underside paler. Palpi beneath and legs white. Fore tibiæ brown.

Expanse 1 inch.

Darjeeling. In Coll. A. E. Russell ; W. S. Atkinson.

Fam. SPILOMELIDÆ.

Genus LEPYRODES.

LEPYRODES GEOMETRALIS, Guen. Delt. et Pyral. p. 278.

L. LEPIDALIS, Walk. Cat. Lep. Het. B. M. xvii. p. 465.

L. PERSPICUALIS.

Zebronia perspicualis, Walk. l. c. xxxiv. Suppl. iv. p. 1347.

Botys flexissimalis, Walk. ib. p. 1426.

Darjeeling (*W. S. Atkinson*).

Genus PYCNARMON, Lederer.

PYCNARMON JAGUARALIS.

Spilomela jaguaralis, Guen. Delt. et Pyral. p. 283.

Zebronia jaguaralis, Walk. ib. xvii. p. 486.

Pycnarmon jaguaralis, Lederer, Wien. ent. Monat. vii. p. 441, t. 17. f. 11.

Darjeeling (*W. S. Atkinson*).

P. ABRAXALIS.

Zebronia abraxalis, Walk. l. c. xxxiv. Suppl. iv. p. 1349.

Darjeeling (*W. S. Atkinson*).

P. ZEBRALIS, n. sp. (Pl. VII. fig. 12.)

Male and *female* white : fore wing with eleven transverse narrow black bands ; cilia white : hind wing pale yellow, diffused with orange-colour externally ; two black basal streaks and three equidistant exterior spots, one being at the anterior angle, another above the anal angle, and the third midway between them ; a white submarginal line ; a black spot on cilia at the apex ; cilia pale ferruginous. Thorax black-streaked. Abdomen pale ferruginous, with black sub-terminal spots. Underside paler, marked as above. Legs and palpi white, with black spots.

Expanse $1\frac{2}{10}$ inch.

Darjeeling. In Coll. A. E. Russell ; W. S. Atkinson.

P. VIRGATALIS, n. sp. (Pl. VII. fig. 10.)

Male and female pearly white: fore wing with three small brown basal spots; a transverse subbasal band, two short bands from the costa, and two bands beneath them from the posterior margin; a similar band along exterior border: hind wing with four brown transverse bands, the middle two joined at their base, the outer band marginal. Thorax spotted with brown, three in front and five on the top. Abdomen with two basal spots and anal tuft brown. Underside paler, marked as above.

Expanse $\frac{7}{10}$ inch.

Bengal. In Coll. W. S. Atkinson; F. Moore.

P. AUROLINEALIS.

Zebronia aurolinealis, Walk. Cat. Lep. Het. B.M. xvii. Pyral. p. 478. Darjeeling (*W. S. Atkinson*).

P. PLUTUSALIS.

Zebronia plutusalis, Walk. ib. p. 478. Darjeeling (*W. S. Atkinson*).

P. BISTRIGALIS.

Zebronia bistrigalis, Walk. ib. xxxiv. Suppl. iv. p. 1348. *Z. inscriptalis*, Walk. MS. B. M. Coll.

P. DISCERPTALIS.

Zebronia discerptalis, Walk. ib. p. 1348. Darjeeling.

Fam. MARGARONIDÆ.

Genus GLYPHODES, Guen.

GLYPHODES STOLIALIS, Guen. Delt. et Pyral. p. 293. Darjeeling.

G. DIURNALIS, Guen. ib. p. 294. Darjeeling (*W. S. Atkinson*).

G. CÆSALIS, Walk. Cat. Lep. Het. B. M. xvii. Pyral. p. 499. Darjeeling.

G. LUCIFERALIS.

Botys luciferalis, Walk. ib. xxxiv. Suppl. iv. p. 1412. *G. lora*, MS. Darjeeling.

G. ACTORIONALIS, Walk. ib. xvii. Pyral. p. 498; Lederer, Wien. ent. Monat. vii. t. 14. f. 4.

Darjeeling.

G. LACUSTRALIS, n. sp. (Pl. VII. fig. 11.)

Male and *female* brownish ochreous: fore wing with a black-bordered pearly pinkish-white semitransparent irregular longitudinal medial streak extending from near the base beneath the cell to near the apex, crossed by an oblique black spot beneath an indistinct black discal spot; exterior border of white streak broadly margined with black and with an outer or submarginal lunular black line: hind wing pearly white, semitransparent, with a brownish ochreous outer border, which is margined within with black; cilia white. Palpi above, head, and sides of thorax brownish ochreous; top of thorax and base of abdomen pale yellowish; tip ochreous. Palpi and thorax beneath and legs white. Underside paler.

Expanse $1\frac{3}{8}$ inch.

Bengal. In Coll. W. S. Atkinson; F. Moore.

G. VAGALIS, Walk. Cat. Lep. Het. B. M. xxxiv. Suppl. iv. p. 1356. Darjeeling (*W. S. Atkinson*).

G. GASTRALIS, Walk. ib. p. 1354.

Darjeeling.

Genus MARUCA, Walk.

MARUCA AQUATILIS, Walk. *l. c.* xviii. Pyral. p. 540.

Genus SYNCLERA, Lederer.

SYNCLERA TRADUCALIS.

Eudiotis traducalis, Zeller, Lep. Caffr. (1852) p. 54.

Synclera traducalis, Leder. Wien. ent. Monat. vii. p. 444.

S. retinalis, Leder. ib. 1857, p. 100.

Glyphodes univocalis, Walk. *l. c.* xviii. p. 499 (1859).

Genus PHAKELLURA, Lansdown Guilding.

PHAKELLURA INDICALIS.

Eudiotis indica, Saunders, Zool. ix. p. 3070.

Phakellura indica, Walk. *l. c.* xviii. p. 514.

P. gazorialis, Guen. Delt. et Pyral. p. 297.

P. TRANSLUCIDALIS, Guen. ib. p. 299.

Silhet.

P. SUPERALIS, Guen. ib. p. 299.

Silhet.

Genus CYDALIMA, Lederer.

CYDALIMA LATICOSTALIS.

Margarodes laticostalis, Guen. ib. p. 303.

Margaronia laticostalis, Walk. *l. c.* xviii. p. 528.

Cydalima laticostalis, Leder. Wien. ent. Monat. vii. p. 397.

Silhet.

C. CONCHYALIS.

Margarodes conchyalis, Guen. Delt. et Pyral. p. 303, pl. 8. f. 9.

Margaronia conchyalis, Walk. Cat. Lep. Het. B. M. xviii. p. 529.

Cydalima conchyalis, Leder. l. c. p. 397.

Larva feeds on *Echites antidiysenterica*.—A. Grote, Esq.

Genus PACHYARCHES, Lederer.

PACHYARCHES AMPHITRITALIS.

Margarodes amphitritalis, Guen. l. c. p. 307.

Margaronia amphitritalis, Walk. l. c. xviii. p. 529.

Pachyarches amphitritalis, Leder. l. c. p. 398.

Silhet.

P. PSITTACALIS.

Parotis psittacalis, Hübn. Samml. exot. Schmett. f. 523.

Margarodes psittacalis, Guen. l. c. p. 308.

Margaronia psittacalis, Walk. l. c. xviii. p. 529.

Pachyarches psittacalis, Leder. l. c. p. 398.

P. POMONALIS.

Margarodes pomonalis, Guen. l. c. p. 309.

Margaronia pomonalis, Walk. l. c. xviii. p. 530.

Pachyarches pomonalis, Leder. l. c. p. 398.

P. MARTHESIUSALIS.

Margaronia marthesiusalis, Walk. l. c. xviii. p. 531.

Darjeeling (*W. S. Atkinson*).

Genus SISYROPHORA, Lederer.

SISYROPHORA PFEIFFERÆ, Leder. l. c. p. 399, t. 13. f. 13.

Darjeeling.

Genus MARGARONIA, Hübner.

Syn. *Margarodes*, Guen.

MARGARONIA TRANSVISALIS, Walk. l. c. xix. p. 976.

Darjeeling (*W. S. Atkinson*).

Genus HOTERODES, Guen.

HOTERODES CINEREALIS, n. sp.

Male and female silky cinereous: hind wing and abdomen whitish cinereous; anal tuft yellow: hind wing of female with an indistinct dusky marginal band. Palpi ochreous. Underside paler.

Expanse, ♂ $1\frac{3}{4}$, ♀ $1\frac{5}{8}$ inch.

Darjeeling. In Coll. A. E. Russell; *W. S. Atkinson*.

Genus PYGOSPILA, Guen.

PYGOSPILA TYRESALIS.

Phalæna-pyralis tyres, Cram. Pap. Exot. iii. pl. 263. f. C.
Pygospila tyresalis, Guen. Delt. et Pyral. p. 312.

Genus EUGLYPHIS, Hübn.

Syn. *Neurina*, Guen.

EUGLYPHIS PROCOPIALIS.

Phalæna-pyralis procopialis, Cram. Pap. Exot. iv. pl. 368. f. E.
Euglyphis procopialis, Hübn. Verz. Schmett. p. 341; Walk. Cat. Lep. Het. B. M. xvii. p. 538.
Neurina procopialis, Guen. Delt. et Pyral. p. 314; Lederer, Wien. ent. Monat. vii. p. 395.

Genus FILODES, Guen.

Syn. *Pinacia*, p., Hübn.

FILODES FULVIDORSALIS.

Pinacia fulvidorsalis, Geyer, Hübn. Zutr. Samml. exot. Schmett. f. 643.
Filodes fulvidorsalis, Guen. Delt. et Pyral. p. 317; Leder. Wien. ent. Monat. vii. t. 12. f. 17.
Euglyphis fulvidorsalis, Walk. Cat. Lep. Het. B. M. xvii. Pyral. p. 539.

FILODES NIGROLINEALIS, n. sp.

Male bright ferruginous: fore wing with a narrow black streak between the veins; two black spots within the cell, and three others at the base of the wing; cilia dark cinereous brown: hind wing and abdomen dark cinereous brown. Underside paler, with the costa and apex also cinereous brown. Legs cinereous black. Palpi black, tipped with ferruginous. Proboscis black.

Expanse $1\frac{4}{10}$ inch.

Bengal. In Coll. A. E. Russell.

F. OCTOMACULALIS, n. sp.

Female dark fuliginous black. Thorax, abdomen, and base of fore wing metallic blue. Both wings with a large semitransparent white discal spot, and a smaller similar spot below the cell half-way from the base of the wing. Underside paler. Fore femora with a white spot at the base; all the tarsi white. First joint of the palpi white.

Expanse $1\frac{2}{3}$ inch.

Darjeeling. In Coll. A. E. Russell; W. S. Atkinson.

Fam. BOTYDÆ.

Genus ASTURA, Guen.

ASTURA PUNCTIFERALIS, Guen. Delt. et Pyral. p. 320; Walk. Cat. Lep. Het. B. M. xviii. p. 548.

Botys punctiferalis, Lederer, Wien. ent. Monat. vii. p. 364.

B. evaxalis, Walk. l. c. p. 995.

Genus BOTYODES, Guen.

BOTYODES ASIALIS, Guen. l. c. p. 321; Lederer, l. c. t. 13. f. 8; Walk. l. c. p. 551.

B. FLAVIBASALIS, n. sp.

Male and *female* yellow; with a broad exterior marginal chalybeate cinereous-brown band, the inner border defined by a narrow black line: fore wing with the border of the band bent below an elongated transverse discal cinereous-brown spot; band of the hind wing with a straight inner border: fore wing with two small black basal costal spots, and a narrow transverse subbasal black line. Some black spots on the thorax. Underside paler, without the basal spots and transverse line. Femora and tibiæ with a black spot at the apex.

Expanse $1\frac{4}{10}$ inch.

Bengal. In Coll. A. E. Russell; W. S. Atkinson.

Genus BOTYS, Latr.

BOTYS SCINISALIS, Walk. l. c. xviii. p. 648.

B. ILLISALIS, Walk. l. c. xviii. p. 653; Lederer, l. c. t. 9. f. 12. Darjeeling (*W. S. Atkinson*).

B. UNITALIS, Guen. Delt. et Pyral. p. 349; Walk. l. c. xviii. p. 655. *B. megapteralis*, Walk. l. c. xxxiv. Suppl. iv. p. 1407.

B. MULTILINEALIS, Guen. l. c. p. 337, pl. 8. f. 11; Walk. l. c. xviii. p. 661; Lederer, l. c. t. 11. f. 3.

Zebronia salomealis, Walk. l. c. xvii. p. 476; Suppl. iv. p. 1348.

B. DAMOALIS, Walk. Cat. Lep. Het. B. M. xviii. Pyral. p. 656.

B. AMYNTUSALIS, Walk. ib. p. 662.

Darjeeling (*W. S. Atkinson*).

B. INCISALIS, Walk. Catal. Lep. Het. B. M. xxxiv. Suppl. iv. p. 1410.

Darjeeling.

B. PLAGALIS, n. sp.

Male and *female* cinereous white: fore wing with a cinereous-brown costal band, discal spot, outer transverse line, and broad ex-

terior band: hind wing with a similar transverse discal line and outer band; cilia whitish anteriorly and with a brown inner line. Sides of head and thorax and third joint of palpi dark brown. Abdomen whitish; tip brownish. Underside paler.

Expanse $\frac{8}{10}$ inch.

Darjeeling. In Coll. W. S. Atkinson; F. Moore.

B. INCOLORALIS, Guen. Delt. et Pyral. p. 333; Walk. Cat. Lep. Het. B. M. xviii. p. 656; Lederer, *l. c.* p. 364.

Silhet.

B. MACCALIS, Lederer, *l. c.* p. 466, t. 9. f. 14.

Silhet.

B. ZEALIS, Guen. *l. c.* p. 332; Walk. *l. c.* xviii. p. 656; Lederer, *l. c.* p. 364.

Silhet.

B. TULLALIS, Walk. *l. c.* xviii. Pyral. p. 649.

Silhet.

B. CALETORALIS, Walk. *ib.* p. 651.

Silhet.

B. PATULALIS, Walk. *ib.* xxxiv. Suppl. iv. p. 1405.

Darjeeling.

B. SUBTESSELLALIS, Walk. *ib.* p. 1406.

Darjeeling.

C. CONCATENALIS, Walk. *ib.* p. 1408.

Darjeeling.

Genus DYSALLACTA, Lederer.

DYSALLACTA NEGATALIS.

Phalangioides negatalis, Walk. *l. c.* xvii. Pyral. p. 468.

Dysallacta negatalis, Lederer, Wien. ent. Monatschr. p. 393, t. 13. f. 6.

Botys monesusalis, Walk. *l. c.* xviii. p. 653.

B. phanasalis, Walk. *ib.* p. 727.

Darjeeling (*W. S. Atkinson*).

DESCRIPTION OF PLATES VI. & VII.

PLATE VI.

Fig. 1. *Tympanistes pallida*, p. 49.

2. — *testacca*, p. 49.

3. *Epilecta pulcherrima*, p. 54.

4. *Synna curvilinea*, p. 69.

5. *Checupa fortissima*, p. 60.

6. *Diphtera pallida*, p. 46.

7. *Lucania pulcherrima*, p. 48.

8. *Gortyna cuprea*, p. 50.

9. *Euplexia discisignata*, p. 57.

Fig. 10. *Canna pulchripicta*, p. 61.

11. *Hadena auroniridis*, p. 59.

12. *Briada varians*, p. 66.

13. *Plusia semivitta*, p. 63.

14. *Diphtera discibrunea*, p. 46.

15. *Auchmis sikkimensis*, p. 49.

16. *Euplexia alborivittata*, p. 57.

17. *Hadena albidisca*, p. 59.

18. *Mythimna cervina*, p. 47.

PLATE VII.

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|---|---|
| Fig. 1. <i>Cotuja deficiens</i> , p. 74. | Fig. 7. <i>Echana plicalis</i> , p. 86. |
| 2. <i>Agriopsis discalis</i> , p. 57. | 8. <i>Bertula chalybealis</i> (♂), p. 87. |
| 3. <i>Tavia catocaloides</i> , p. 71. | 9. <i>Anoratha costalis</i> (♂), p. 82. |
| 4. <i>Fascellina viridis</i> , p. 79. | 10. <i>Pycnarmon virgatilis</i> , p. 92. |
| 5. <i>Episparis tortuosalis</i> (♂), p. 81. | 11. <i>Glyphodes lacustralis</i> , p. 93. |
| 6. <i>Talapa caliginosalis</i> , p. 82. | 12. <i>Pycnarmon zebralis</i> , p. 91. |

[End of Part II.]

January 24, 1867.

Dr. J. E. Gray, F.R.S., V.P., in the Chair.

Mr. P. L. Scater called the attention of the Meeting to a specimen of a species of Ratel (*Mellivora*), obtained by the Society on the 3rd of August 1866 from a dealer in Liverpool, who stated that he had received it by the West-African Mail. This animal appeared to belong to a species different from either the Indian *Mellivora indica* or the South-African *M. capensis*, of both of which the Society's Menagerie had for several years contained living specimens. Dr. Gray had diagnosed these two species of *Mellivora* in a recent communication to the Society* as follows:—

Mellivora indica. Black; the back iron-grey; crown of the head white. India.

Mellivora capensis. Black; the back iron-grey; the crown and a broad stripe down each side of the back to the tail white. South Africa.

To these species, both correctly figured in the second series of Wolf and Scater's 'Zoological Sketches,' Mr. Scater proposed to add a third, founded upon the present specimen, to be diagnosed as follows:—

Mellivora leuconota (Plate VIII.). Smaller: black; back white, purer towards the crown. West Africa.

The following papers were read:—

1. On a New Geckoid Lizard from Ceylon.
By Dr. J. E. GRAY, F.R.S., V.P.Z.S., &c.

(Plate IX.)

The British Museum has lately received from Mr. Cutter some specimens of a Gecko from Ceylon, which appear to be undescribed and to form a distinct genus, which may be called *Geckoella*.

Toes five on each foot; they are thick at the base, with the ends more slender and rather compressed; the under surface is furnished

* See P. Z. S. 1865, p. 680.